THE AUK:

A QUARTERLY JOURNAL OF

ORNITHOLOGY.

VOL. XXIX. OCTOBER, 1912. No. 4.

THE FREEZING OF CAYUGA LAKE IN ITS RELATION TO BIRD LIFE.

BY ALVIN R. CAHN.

CAYUGA is the largest of seven, nearly parallel lakes which lie in the central portion of New York State. They all extend in a north and south direction, and either directly or indirectly connect at the northern end with Seneca River. Numerous streams are tributary to Cayuga at the south end; the two principal ones are Fall Creek and the Inlet, both of which proved to be important in their relations to bird life, since they furnished open water throughout the period during which the lake was frozen.

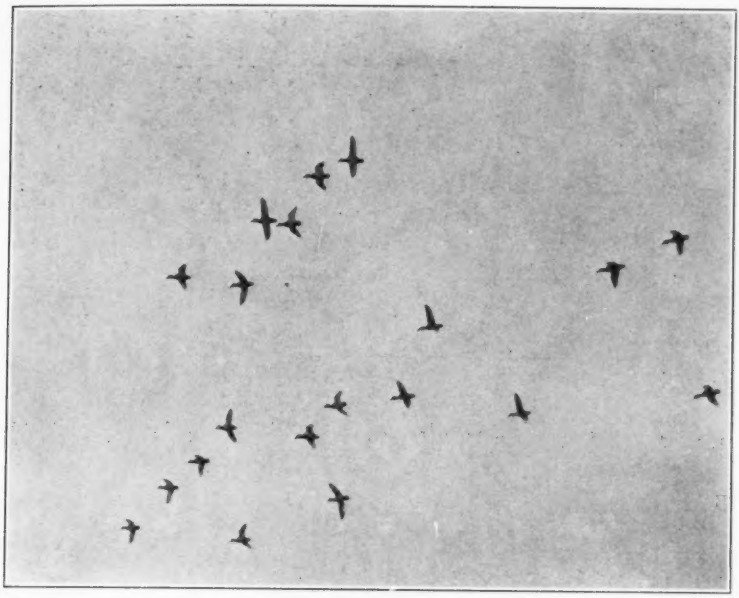
The conditions necessary for the complete surface freezing of Cayuga Lake are intensely cold weather, and absolutely quiet atmospheric conditions for a prolonged period. As Cayuga Lake is forty miles long, with a surface area of 66.8 square miles, and situated as it is in a trough between wind-swept hills, it is very seldom indeed that the above conditions prevail for a sufficient length of time to permit the complete closing of the lake. In the present instance, the freezing was preceded by six weeks of extremely cold weather, the temperature dropping as low as sixteen degrees below zero, and the entire period accompanied by high north and northwest winds. Freezing would have occurred earlier than it did except for the continued strong winds. When these abated, the lake froze over entirely during a single night.

There seems to be a tradition that Cayuga Lake closes every twenty years, some basis for which appears in the dates of complete freezing. They are: 1796, 1816, 1836, 1856, 1875, 1884 and 1904. The first two dates are approximated,[1] but for the year 1836 we find records showing the lake to have been covered by a thin coating of ice for a day or two;[2] in 1856 the lake was frozen sufficiently to allow teams to cross.[3] A similar hard freezing occurred in 1875,[4] and in 1884 the lake froze over on February 15, and remained in this state until April 4. I am told by several persons in Ithaca that similar conditions obtained for a short time in 1895, but I am assured on very good authority that at no time was it completely closed, there existing an area of several square miles which remained open. In 1904 the surface froze completely about the middle of February,[5] but remained so for a short time only.

It seems evident that this condition of the lake bears a very important relation to bird life, particularly to those species which depend upon the open water for subsistence. So long as a few square miles or even a smaller area remain open, wherein the birds may feed, the effect of the freezing is lost. For this reason, as far as the birds are concerned, the freezing of 1895 may be eliminated. Again, the duration of the frozen period bears an important relation to the bird life, and it is to be regretted that there are no records of ornithological observations for the extremely long period occurring in 1884.

As previously stated, six weeks of excessive cold preceded the freezing during the winter of 1912. Ice twenty-two to twenty-four inches thick formed in the shallows at both ends of the lake, and as the cold weather continued, the frozen area extended outward little by little. During the afternoon and night of February 10, the wind fell, and the morning of the 11th found Cayuga Lake frozen from end to end. On the 12th I made my first visit to the lake about Ithaca to investigate conditions. The air was alive

[1] Reed, H. D., & Wright, A. H. "The Vertebrate Fauna of the Cayuga Lake Basin, N. Y." Proc. Amer. Phil. Soc. Vol. XLVIII No. 193, 1909, p. 372.
[2] Ithaca Daily Chronicle, Dec. 22, 1846, Vol. 1, No. 140.
[3] Ithaca Weekly Journal, March 12, 1856.
[4] Ithaca Daily Journal, March 3, 1875.
[5] Ithaca Daily Journal, Feb. 16, 1904.



1. CANVAS-BACKS FLYING OVERHEAD.

2. CANVAS-BACKS AT REST.

with ducks; flock followed flock, in one continuous stream, all flying southward. I am told by Mr. Vann that even more went by on the 11th than on the 12th. By the morning of the 13th the southerly migration had almost ceased, but there were great numbers at rest upon the ice, and from this time on dead birds were found regularly. Large numbers of ducks sought the open, flowing spots of Fall Creek and the Inlet. While there was a little open water here, there was no food, and the majority very soon left. At Ludlowville, about seven miles down the eastern shore, there was a single spot where a spring fed into the lake, forming an open area about thirty yards square, which soon became the rendezvous of all the ducks within a radius of many miles.

Here, a successful attempt was made to feed them. A week after the freezing over of the lake, this pool was black with ducks; so great had their numbers become that free movement was out of the question. It seemed as if there was not room for another individual. Gradually, however, this crowd decreased, the stronger ones leaving for the south continually. From February 23 to March 3, there were not more than three hundred there. Five species were represented in this flock: Bluebill, Canvas-back, Golden-eye, Black Duck and Buffle-head. The Black Ducks were the most wary — the Canvas-backs the least so. It was a rare sensation indeed to be surrounded by flying hundreds of wild ducks, wheeling and flapping within fifty feet of one's head.

In the following paragraphs will be discussed the various species of water birds found from February 10 to March 3, within the area between Ludlowville and Ithaca, including the conditions in which the birds were found, the numbers of dead recorded, and any other points observed which may prove of value.

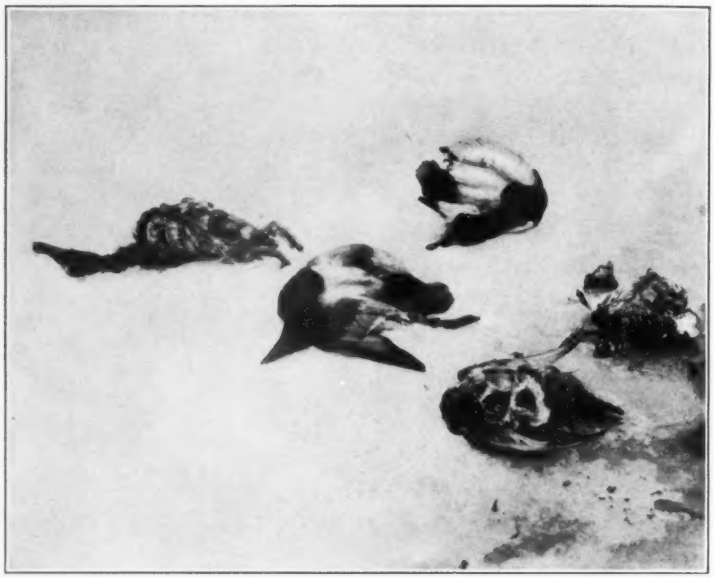
The author gratefully acknowledges the notes and assistance of Professor H. D. Reed, Dr. A. H. Wright, Mr. L. A. Fuertes and Mr. John Vann, as well as the hearty co-operation of Mr. H. H. Knight, with whom many of the accompanying photographs were taken.

1. **Colymbus holboelli.** HOLBOELL'S GREBE.— The freezing of Cayuga Lake offered a rare opportunity for a study of this most interesting and apparently little known bird. Until the present time, the Holboell's Grebe has been considered only a rare visitant at the southern end of the

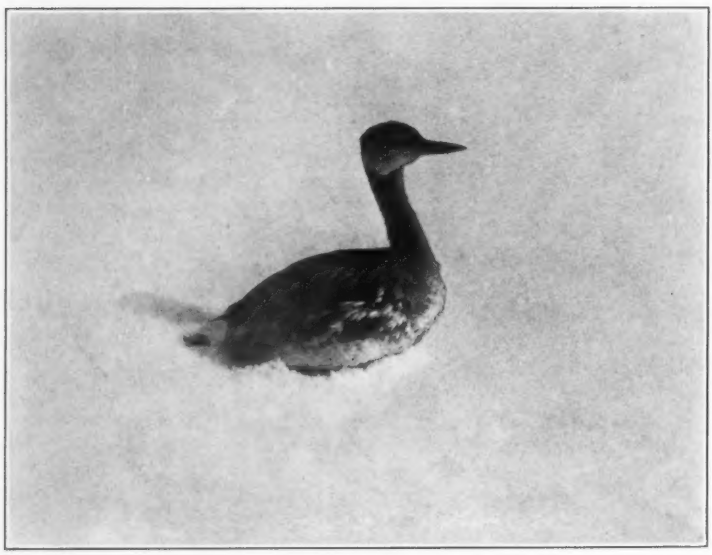
lake,[1] one or two being recorded almost every winter. It has proved, however, to be the predominant grebe during this winter, twenty-eight individuals having been taken. The reason of its unprecedented abundance here is undoubtedly to be found in the six weeks of extremely cold weather, and the consequent closure of waters in other regions. The sudden closing of the lake's surface in one night left these birds in an absolutely helpless condition, since open water is a necessity for taking flight in this group of birds, Holbœll's Grebe being no exception to the rule. As a result, eleven beautiful specimens were picked up alive from the ice in perfectly good physical condition. If approached while sitting on the ice, these birds made no attempt to escape. They would strike at the outstretched hand, and would emit calls very loon-like in general quality. Once the bird alights upon the ice, it is unable to take flight, and must await starvation or other tragic end. At best, all it can do is to flap its wings and possibly scrape along over the ice for a few feet. The position of the legs, together with the smooth surface of the ice, rendered these efforts at locomotion entirely futile. The best opportunity of observing this bird occurred in a little piece of open water in Fall Creek, below Ithaca Falls. This hole was about twenty-five feet square, shallow at one end and deep at the other, surrounded on three sides by thin ice, and on the fourth by ice sufficiently strong to afford good footing. The bird had apparently alighted in the pool, and even here there was insufficient open water for taking flight again, and it was therefore possible to study the actions of this bird at very close range. When approached, the bird dove, and remained under water nearly a minute. As soon as it came up, it would dive again on the instant so long as the observer remained near. The water was clear, and the bird could be seen plainly, shooting and zigzagging about, midway between the surface and the bottom. While swimming under water, the neck is extended to its utmost, and both legs and wings are used. With neck outstretched, the bird offers the least possible resistance to the water, there being a smooth and gradual transition from the tip of the slender bill to the middle of the back, the widest part of the body. The speed which is developed under water is marvelous, at times it being almost impossible to follow its movements, which were so rapid that the bird appeared more like a large, gray fish darting about. When coming to the surface, the bill and head appeared slowly, when a glimpse of the observer caused it to dive again. In diving, even though the body was under water, the bill went down first, so that it really dove instead of sinking quietly. After having been under water almost continually for over fifteen minutes, the bird was tired out, and finally came to the surface on the opposite side of the pond from the observer. Here, it drifted nervously about, giving its peculiar squawking note every few seconds. After being watched for some time, it was driven into the

[1] Reed & Wright. The Vertebrate Fauna of the Cayuga Lake Basin, N. Y., p. 409.

CANVAS-BACKS RISING.



1. DEAD SCAUP DUCKS AND CANVAS-BACKS.



2. HOLBŒLL'S GREBE STRANDED.

shallower water, where it suddenly dove and remained down over a minute. It reappeared finally over two hundred feet away, crawling upon the thin ice through a hole which it had made with its head and bill. The bird was taken from the ice without a struggle or attempt to escape. The other ten living specimens were picked up from the ice on the lake proper, far from any open water.

The stomach contents of the specimens that were found dead were examined and proved interesting, as in each case the sole material found proved to be a ball of feathers.[1] Both the feathers and the inner wall of the gizzard were stained a deep and brilliant emerald green, so that when the contents were removed they appeared to be a mass of dried Algæ. Several of the feathers were dried, after having been thoroughly cleansed, and were identified as coming from the belly of the Grebe itself. There is room for a great deal of conjecture as to the significance of these feathers in the gizzard. All the birds examined were fat, and had died probably as as a result of severe exposure, rather than of starvation. Mr. L. A. Fuertes tells me that the gizzards of the various species of grebes found in this country, which he has examined, have invariably contained a few, and in some specimens, quite a ball of feathers. The green coloring matter proved to be bile. The presence of this bile in the gizzard is another interesting point, a condition due possibly to abstinence from food, as it was present in the case of every bird examined, and present in such abundance as to be very noticeable. There are records, then, of eleven living birds that were captured. Besides these, in the area between Ludlowville and the south end of the lake, seventeen specimens were found dead upon the ice, making a total of twenty-eight birds for eight square miles, and undoubtedly there were some of which nothing is known. The Holbœll's Grebe, because of its highly specialized form, probably suffered the most of all the birds upon the lake, and few, if any, escaped.

The vitality of these birds is truly remarkable. As the lake froze on the 10th, the birds had their last possible chance to feed on that date. A male, the only one which showed signs of the red neck, which was taken on the 12th, died on the 28th without having eaten during its captivity. In marked contrast to the other specimens, this bird showed no trace of fat, and instead of weighing 2.5 lbs., which was the average of those that died of exposure, it weighed a scant 1.25 lbs. The average measurements of four birds were: length, 20 in.; extent, 30.8 in.; wing, 7.5 in.; bill along gape, 2.8 in.; tarsus, 2.5 in. Average weight, 2.5 lbs.

2. **Colymbus auritus.** HORNED GREBE.— None of these birds were seen alive, but there are records of three found dead upon the ice. All three specimens had been greatly damaged by crows and gulls.

3. **Podilymbus podiceps.** PIED-BILLED GREBE.—A single dead specimen was found frozen in the ice near the east shore, on the third day after the freezing.

---

[1] Eifrig, C. W. G. Notes on Some Northern Birds. Auk, XXIII, July, 1906, pp. 314–315.

4. **Larus argentatus.** HERRING GULL — There was one flock of forty-one Herring Gulls which spent six days within this limited area. Contrary to their usual habits, these birds remained constantly on the ice, and took to the air reluctantly when approached closely. One interesting point was noted which showed the gulls to be hard pressed for food; there were great numbers of "Saw-bellies" (*Pomolobus pseudoharengus*) frozen in the ice at a depth of from three to eight inches. Above those that were nearest the surface, the ice was found to be pecked, showing where the gulls had attempted to reach the fish. One bird was actually seen while thus occupied. No deaths are recorded among the gulls, due, no doubt, to the abundance of dead ducks upon the ice.

5. **Mergus americanus.** MERGANSER.— A number of females were encountered in the Inlet, and two pair were constantly seen in Fall Creek. They appeared not to suffer at all for lack of food, and I often watched them dive under the ice, and remain under for a period ranging from one to two minutes. No dead were found.

6. **Anas rubripes.** BLACK DUCK.— During the first days of the migration, quite a number of these birds were seen, but they were exceedingly wild, and approach was impossible. A flock of approximately one hundred inhabited the water hole at Ludlowville, but the moment they were startled, they rose and flew over the ice, when they lit, and where they remained for the most part until twilight. At dusk they returned to the hole. The Black Ducks did not suffer at all for want of food, as more than once they were found in a field of Alfalfa, two miles from the lake. No deaths are reported.

7. **Marila americana.** REDHEAD.— Numerous flocks were encountered daily, but they were smaller in size than the flocks of the other species, and more wary. Only one small flock of seven allowed me to approach within forty feet of them before they took to wing, after which they rose to a considerable height, and were soon lost in the distance. At another time one of these birds was watched while standing within thirty feet of it, as it swam around in the Inlet in company with a Bluebill and a Golden-eye. This particular bird was a female, and of the three, was by far the most lively. It was she that led them up stream a few yards, and when they finally rose, she took the lead. The Redheads probably suffered very little, though why any particular species should suffer more or less than another, would be difficult to say. Personally, I did not find a single dead Redhead, but there are reports of two having been found.

8. **Marila valisineria.** CANVAS-BACK.— The Canvas-back was second to the Bluebill in abundance. When found they were in small flocks of from three to thirty, but over one hundred inhabited the Ludlowville pool. The numerous flocks were small in size. Not a day passed but that upward of fifty Canvas-backs were seen in flocks averaging ten or fifteen. These ducks suffered, to all appearances, as much as any species on the lake. A flock of twenty-two was approached to within thirty feet one afternoon before they gave any heed, but finally they rose heavily and flew low over

the ice a distance of sixty yards, where they lit, and immediately assumed a resting posture. Two of these ducks were captured alive, both being taken almost as easily as one would take an apple from the ground. The first made one feeble flight when approached, but that was all. He was followed and picked up off the ice without a struggle. The second was taken from the ice without having made any attempt to fly. The condition of both of these birds was pitiful, to say the least. Hardly able to stand erect, and too feeble to mind what was going on around them, they sat on the ice in a more or less dazed condition. The feathers were unpreened, and those of the breast and belly were yellow and matted with grease. Both of these birds were found on the ice of Fall Creek. There are records of twenty-two Canvas-backs that were found dead within this area. Allowing for those that were missed, it is highly probable that these eight miles held about twenty-eight dead of this species, the per cent of mortality being greater than in any other species. By the small pool of open water at Ludlowville, three dead Canvas-backs, together with two dead Bluebills, were found, as shown in the photograph. (Plate XX, Fig. 1). The stomachs examined contained nothing but pebbles, averaging 14.5 grams in weight. These ducks were woefully thin, being, in very truth, nothing but "skin and bones."

9. **Marila marila.** SCAUP DUCK, BLUEBILL.— The most abundant duck seen on the lake during this period was the Bluebill. As a general rule, these birds were found in flocks of various sizes, ranging from a few individuals to four hundred, but single birds were found in the open water of the various streams tributary to the lake. The largest flock seen was just off Portland Point. This flock was discovered at rest upon the ice, and so close together were they, and so numerous, that the birds gave the appearance of a solid black line, and it was not until one had approached to within one hundred yards of them that one could be sure that it was indeed a flock of ducks. The birds were quite indifferent to being approached, and it was not until one was within two hundred feet of them that they showed any signs of uneasiness. When within one hundred feet, they rose slowly and flew some little distance down the lake, where they settled once more into their compact formation. It was not until they rose that one realized that there were easily over four hundred ducks in the flock. It was all but impossible for these birds to rise clear of the ice. The indifference shown toward unguarded approach, the reluctance with which they rose, the short distance which they flew, in fact, their every action bespoke exhaustion and weakness. In a small piece of open, rapidly flowing water in Fall Creek, a female of this species was caught by hand, without difficulty. The bird, too exhausted even to try to fly, could make no headway against the current, and was therefore easily captured. It was too weak to eat, and died within twenty-four hours. Two peculiar incidents with regard to Bluebills have been brought to my notice. One specimen was found while still alive, in which over half the webbing of both feet had been frozen and dropped off. Another was found frozen in a

cake of ice, with nothing but the head and about half the neck protruding from the mass. The duck, still alive, was chopped out, when it was found that the ice had in some way frozen over the duck, leaving water next to the body. This was undoubtedly kept from freezing by the action of the legs and the body heat. The bird was uninjured, and after being fed, seemed little the worse for its experience. In all, nineteen dead Bluebills were found upon the ice of the lake, within six miles of Ithaca, and reports coming from various points along the lake, seem to indicate a rather uniform mortality throughout the entire area. The specimens examined were extremely thin. There was no trace of fat on the bodies, and the breast bones were barely covered by flesh. The stomachs contained nothing whatsoever, while in the gizzards were found small quantities of gravel averaging 13.45 grams in weight.

10. **Clangula clangula americana.** GOLDEN-EYE.— Golden-eyes were encountered daily, although they were less numerous than any of the preceding species of ducks. When seen they were usually in flocks of from twenty to forty, but only a few flocks were seen each day. Usually it was impossible to approach within fifty feet of these birds, although in one instance a flock of a dozen individuals was watched from a considerably shorter distance than this. A beautiful male specimen was picked up in the same manner as the Canvas-backs were captured, and with as little resistance. To all external appearances he was perfect, yet his body was a sad contrast to his brilliant plumage. There are records of five dead Golden-eyes found within the six miles studied. As with the other ducks, the gizzards contained only pebbles, but in smaller quantities, averaging 8.5 grains in weight.

11. **Charitonetta albeola.** BUFFLE-HEAD.— A single male specimen of this species remained constantly in the open water at Ludlowville, and even with stones could not be driven out. It seemed to thrive well on the corn it found scattered there, and was absolutely fearless of human presence. This was the only specimen seen.

THE NIAGARA SWAN TRAP.

BY J. H. FLEMING.

SINCE the great Swan disaster of March, 1908,[1] Whistling Swans (*Olor columbianus*) continue to settle in the upper Niagara River in spring, and floating with the current, a whole flock is sometimes caught in the rapids and swept over the Falls; once in the trap there seems slight chance of escape, though some birds survive the trip over and of these a few, by flying up the river, are able to surmount the Falls and escape. The natural route of escape down the river is barred, as the birds object to flying over the ice or under the Upper Suspension Bridge, and they usually fail to get high enough in the air to clear the Falls.

The spring of 1909 was notable at Niagara for the amount of ice that filled the gorge below the Falls leaving very little open water. I am indebted to Mr. J. S. Wallace for the following account of the losses of that spring. "On Sunday, March 28th, eleven swans were taken on the ice bridge below the Falls, Mr. Leblond getting seven of these, one of them alive and in such good condition that it is now being fed and cared for, and is becoming quite tame and appears to be practically uninjured; another of the eleven mentioned above is also alive and to all appearances uninjured.

"In addition to those taken Leblond saw five others rise from the ice bridge and fly off up the river apparently uninjured, although he does not know that these five were carried over the Falls. The day on which the birds were taken was neither foggy nor wet; so that these accidents to the birds apparently happen at any time.

"About 150 to 200 birds were seen on the river above the Falls on the 28th, and another lot of 25 or 30 were seen flying up the river one day near the end of last week (about March 30).

"The ice bridge extends from the Upper Suspension Bridge almost to the foot of the Falls, and gives the hunters very little chance to secure ducks or other game which may come over at present."

---

[1] Auk, 1908, pp. 306–309.

I was at Niagara Falls, Ontario, on April 15th, and saw the two living swans; one was an adult with a lemon yellow spot on the beak, and the other was not fully adult, the beak having an almost imperceptible flesh-colored spot and there was a good deal of gray in its plumage. The only note the birds uttered was a low call. I saw Mr. H. Williams and Mr. Leblond but got no further information than that in Mr. Wallace's letter. There is no record of any swans being killed in 1910, but on March 22, Mr. James Savage, of Buffalo, N. Y., saw a flock estimated at 28 in the upper river opposite Chippewa, Ont., and I quote from his letter. "You may be interested to know that there was another flock of swans on the Niagara River last March which did not go over the Falls. Mr. Broderick, the game inspector at Niagara Falls, N. Y., phoned me that there were twenty-eight of them near Navy Island and that he had approached within 100 yards of them before they took flight. I joined him in the afternoon and we had an interesting experience trying to photograph them about a mile above Goat Island. They finally mounted into the air and filed away towards Lake Ontario. It is not improbable that we saved their lives by driving them away from the place where so many of their kind have come to an untimely end."

In 1911 some swans came over the Falls, 22 were taken on March 23, most of them by Mr. Leblond. Some of these birds were seen by Mr. Wallace, but I have no note of the conditions of the weather or ice at the time. Mr. Ottomar Reinecke of Buffalo records a large flock seen on April 11, presumably in the upper river.

The 1912 toll is the heaviest yet recorded. Mr. Savage writes of the March losses as follows: "My notes show that four swans were picked up on the morning of March 18, and seven others were secured by Leblond on the morning of March 27. He tells me that on this later day, three others were obtained by other parties."

On April 6 Mr. Leblond telephoned me that a great number of swans had come over the Falls that morning, and that he had taken 70 out of the river. I went to Niagara Falls next morning and saw Mr. Leblond at the 'Maid of the Mist' landing on the Canadian side. Two men were standing on the edge of the break-

water with long poles, waiting for birds to float in, the river was open, and only a few cakes of ice coming over the Falls; there was a large mound of ice rising from the rocks below Goat Island. The outlet of the power company on the American side discharges just below the first bridge and, sending a great volume of water across the river, creates an eddy at the landing so that any bird coming down the river with the current is checked below the bridge, sent across the river, and up to the 'Maid of the Mist' landing within reach of the watchers on the breakwater. Mr. Leblond tells me that he first heard swans calling at daybreak on the 6th and they very soon began to float in. He did not say how many of these were alive. There was a slight fog on the river at daybreak. During the day he took seventy out of the river and thinks that fifty or sixty more were taken by others, probably more than 125 altogether; besides these there were four more taken today, and I saw two in the eddy and was told there were more on the shore further down. Besides these there were ten swans alive in the river below the Falls. The birds taken yesterday were at the Hotel Lafayette where Mr. H. Williams showed me sixty of Mr. Leblond's birds. He considers the total catch nearer 200 than 125. All the young birds, except one, had been picked out for eating, so the proportion of young to adults was probably one in seven. Everyone agrees that this flight was greater than the one in 1908, and that many more were taken this time in spite of there being no ice bridge; the birds I examined were less battered up than in 1908 and could not have been long in the water, as they were dry, that is the feathers were not water logged. The birds exhibited a very interesting series of eye spots, one very small adult having a solid lemon yellow spot extending forward from the eye for nearly an inch and a quarter; the color of the spots ran from lemon yellow to flesh yellow. In 1908 the spots ran from yellow to red owing, no doubt, to the ice crushing the birds had received, and the subsequent freezing.

The ten birds remaining alive on the river below the Falls were divided into two flocks, one of which was on the American side, the other on the Canadian; these I watched both from the river level and from the bank above. They were continually floating down the river with the current, and, taking wing, would fly up

towards the Horseshoe Falls, never allowing themselves to float past the 'Maid of the Mist' landing on the American side; they seemed to be afraid to pass under the Upper Suspension Bridge, though their road to safety lay down the river. Herring Gulls were continually passing underneath the bridge but it was too much for the swans to face. The swans rise easily from the water quite like the Herring Gulls, and the easy flapping of the wings on rising and folding of the wings on settling were much the same. Only one swan rose to any height above the water, possibly half way up to the brink of the Falls. The rest kept close to the level of the water, always rising against the current and flying towards the Canadian Falls, but were either unable through weakness or too frightened to rise above and escape into the upper river. One bird was using a cake of ice as a resting place, but he too, was unable to face the prospect of going under the bridge. I have no doubt that all these birds eventually grew too weak to resist the current and were drowned. The Swans arrive in the Niagara with very little food reserve and are unable to get food in the river, and weakened by their battle with the current fall easily at night into the trap set by the rapids above the Falls, as do many other species of water birds. I am told a good many Canvas-backs came over the Falls this spring, I saw one on April 7 besides several Golden-eyes that had met the same fate. Mr. Savage in a recent letter says, "It seems a pity that so many of these noble birds are destroyed every spring, but I see no way to prevent it, if they arrive during the night. If they should be seen on the waters above the Falls, arrangement might be made to drive them away."

METHODS OF ESTIMATING THE CONTENTS OF BIRD STOMACHS.

BY W. L. MC ATEE.

In his report on "The Food of Birds in India," C. W. Mason expresses decided opinions on the merits of the numerical and the percentage-by-bulk methods of estimating the contents of bird stomachs. Regarding his own work, Mason says: "I have made no statements in a general way as to the relative bulks of the food taken. We see it stated repeatedly that relative bulks of food taken by birds are very important in any conclusion that we may wish to draw from economic entomology. [ornithology?]..... Our only method for obtaining this end practically consists of a complete study of the food of the birds, from specimens obtained throughout the year under all climatic, physical and seasonal conditions and even at different times during the day (this latter point is certainly one of importance in some birds and possibly therefore in most)....Comparative bulks of foods, if expressed merely as percentages, are of absolutely no value whatever, and cannot give any idea as to the true economic ratio of the food of the bird in question. What we want to know is the exact number of grains of corn, the number of insects, etc., taken, and we must not draw our conclusions from a small number of records nor from a mass of records that have been accumulated at one season of the year only. We must take a fair average." (pp. 18–19.)

As these dicta regarding the percentage valuation of the elements of bird food reflect upon the methods in continuous use by the Biological Survey, U. S. Department of Agriculture, since 1895, a defense of those methods is in order. Arguments similar to those of Mason have been made before, but always it appears by those having a relatively small amount of experience in the actual examination of the contents of birds' stomachs. In fact Mason's arguments are not so strongly opposed to estimation of percentages by bulk, as some of his sentences by themselves seem to imply. For instance he admits that the bulk method would be satisfactory if a large number of stomachs, representing all localities and seasons,

be examined. Later he states that conclusions must not be drawn from a small number of records, we must take a fair average. These things are exactly what every economic investigation, worthy of the name, strives to do, and what has been done with great success in the case of numerous species of birds in the United States. The final percentages of food obtained for some species are not changed by 1 per cent, by the addition of 100 stomachs taken in a restricted area in a single season.

The numerical system (which Mason prefers) of denoting the contents of bird stomachs in contrast to the percentage-by-volume system, has assumed a number of different forms. The modifications we are acquainted with are as follows:

1. Gives total numbers of various groups of insects, seeds, etc., taken by the whole collection of birds examined.

2. States the total number of birds, taking certain items of food, or in other words, the number of times a certain food is taken.

3. States the number of birds eating certain articles of food and the number of specimens taken.

4. The proportion of the number of times a certain food is taken to the total number of times all foods are taken, is considered the percentage of that food in the diet.

5. Estimates the proportions of food items according to their numerical representation among the total of all specimens eaten.

No. 1 is used by Mason (l. c.), No. 2 by Fisher.[1] No. 3 by King [2] and Newstead,[3] No. 4 by Gilmour,[4] and No. 5, for the estimation of animal food only, by Wilcox.[5] The last named estimates the percentages of vegetable food by bulk.

Thus 6 investigators who have tried to present the results of stomach examinations by a numerical system, have adopted at least 5 very distinct methods. This indicates that no very satisfactory numerical system has thus far been proposed, a fact which has not however prevented 3 of these men, viz: Mason, King, and Wilcox, from severely criticising the percentage-by-volume method.

---

[1] [Fisher, A. K.] Bul. 1, Biol. Survey, 1889, pp. 133–143, and Bul. 3, Biol. Survey, 1893.

[2] King, F. H. Trans. Wis. State Agr. Soc., Vol. XXIV. 1886.

[3] Newstead, R. Suppl. Journ. Bd. Agr. [London], XV, No. 9, Dec., 1908.

[4] Gilmour, John. Trans. Highland and Agr. Soc. Scotland, 1896, pp. 1–93.

[5] Wilcox. E. V. Bul. 43, Ohio Agr. Exp. Sta., Sept., 1892, pp. 115–131.

In striking contrast to the diversity of opinion about a numerical system is the consistent application of the volumetric method, by at least 9 American food analysts. Dr. G. Rörig of Germany prefers the related but more technical and difficult method of ascertaining proportions by weight.

Some of Wilcox's objections to the percentage-by-bulk system are stated in the following quotation.[1]

"How to estimate the relative proportions of the various food matters found in the stomachs examined is a very important but rather difficult question. Upon a slight consideration it becomes evident that we cannot base our proportions upon the relative bulk of different materials. To illustrate, suppose we place on one side of the equation a blackberry and on the other enough chinch bugs to equal the bulk of the berry. It would obviously be very absurd to assume that the one counterbalances the other. Mr. King....has considered this difficulty in the following words:

"If we compare the corn plant-louse, the gall stage of the grape phylloxera, the plum curculio, the small parasitic military microgaster, which lay its eggs in several kinds of cutworms, the potato beetle and the chinch bug with the large coral-winged grasshopper bulk for bulk, the ratios will appear about as follows:

1	Coral-winged	grasshopper	=	12,000 military microgasters.
1	"	"	=	3,000 phylloxera.
1	"	"	=	1,500 corn plant-lice.
1	"	"	=	750 chinch bugs.
1	"	"	=	60 plum curculios.
1	"	"	=	7 potato beetles.
1	"	"	=	1,000 young potato beetles.

"By a system of gauging bulk for bulk it is evident from the table that one coral-winged grasshopper eaten by a bird would give it a credit which would offset completely the destruction of 12,000 military microgasters, a proposition sufficiently absurd."

We may remark that Wilcox's own system of estimating the proportions of animal food according to the number of individuals, violates every intent of this precept, as it also gives all individuals equal weight.

---

[1] Wilcox, E. V. Bul. 43, Ohio Agric. Exp. Sta., Sept., 1892, pp. 118–119.

F. H. King, who is thus quoted by Wilcox, further asks:[1]

"*How shall a bird's food account be expressed numerically in terms of debit and credit?* This is at once the most difficult and the most important of all the questions requiring solution in order to express the *specific* economic relations of any bird.

"Nothing can be more certain than that, after the food of a bird has been classified under the heads "Elements Beneficial" and "Elements Detrimental" to man, neither the relative volumes nor the relative weights of these two classes of material can express the true economical relations of the bird. (p. 398.)

"A peck of plums and a peck of curculios, a peck of wheat and a peck of chinch-bugs, or a peck of corn and a peck of cutworms, are manifestly not to be considered as equivalent values on opposite sides of any account." (p. 399.)

And Mason says as above noted "Comparative bulks of food, if expressed merely as percentages, are of absolutely no value whatever, and cannot give any idea as to the true economic ratio of the food of the bird in question."

First it should be stated that these gentlemen have no occasion to be so emphatic; their criticisms are wide of the mark for no one claims that percentages do express economic values. They are simply convenient handles to facts and they must be interpreted.

This point is well brought out by the arguments Wilcox advanced in proposing his hybrid system. He says:

"Having seen from the start that the ratios of the different food materials could not justly be estimated according to bulk, and having seen also that a system based upon the number of insects, plant fruits, etc., found in the stomachs examined would be almost equally likely to introduce error, and that it would be a system particularly difficult to carry out in consequence of the fragmentary condition of the food, I decided to combine these two systems of computing the proportions in a way which seemed to me to represent justly all the elements of food. It would be approximately true to say that I have estimated the proportion of animal food according to the number of the individuals, and vegetable food according to bulk. But all fruits which have a definite number of

[1] Trans. Wis. State Agricultural Society, Vol. XXIV, 1886.

seeds have been estimated upon a numerical basis. It is evident that this would have been very difficult or even impossible in the case of blackberries or raspberries in which the number of seeds is so variable.

"It may be objected that the computation of the vegetable food on one basis and of the animal food upon another basis is a fruitful source of error. But I have exercised all care and diligence to avoid every possibility of error, and, in fact, an estimation of the relative proportions of the several kinds of food would not make the vegetal part appear larger than it really is, since a raspberry or blackberry is no greater in bulk than an earthworm or May beetle. It may as well be admitted that, in the present state of knowledge, only an approximation to the truth can be attained in a statement of the relative proportion of the various food materials in a bird diet.

"But even after we have tabulated the numerous articles of food in their differing proportions in a more or less satisfactory manner, the task is by no means completed. In order that we may decide whether the robin is on the whole a benefit or an injury to farmers and gardeners, we must first determine the economic relations of the various species of plants and animals upon which the robin feeds."

It is very evident that interpretation of economic values is the most important point in presenting the results of stomach examination. Whether such results are expressed by the numerical or by the percentage system, the figures in themselves are powerless to convey an impression of economic values. Hence the assertions of Mason, King and others are no more a criticism of the percentage-by-bulk system than they are of the numerical system. For instance King's dictum that "a peck of corn and a peck of cutworms are manifestly not to be considered as equivalent values on opposite sides of any account," applies just as well to his own numerical accounts. Does it mean anything definite to say that 10 individuals of a certain species of bird have consumed 20 beneficial insects and 35 injurious ones? Do these figures tell us whether the insects in question are large or small? Whether they are

[1] Bull. 43, Ohio Agric. Exp. Sta., Sept., 1892, pp. 119–120.

greatly or only moderately beneficial or injurious? do the figures give us any idea as to whether this account about balances? or whether one side greatly overbalances the other?

On the contrary it is evident that they stand just as much in need of interpretation, as do percentages. Hence the question between the two systems is not purely one of expression of economic values, as some supporters of the numerical system would have us believe, but one of the means best adapted to expressing the relations between the various food elements. To the writer's mind the percentage-by-bulk system has all the better of the argument, but let us not so decide without giving the various numerical systems a hearing.

Mason says, "What we want to know is the exact number of grains of corn, the number of insects, etc." To illustrate we may cite one of Mason's summaries: "Of 142 insects taken by 12 birds, 7 are beneficial, 50 injurious and 85 neutral." (p. 118.) Are we to understand that this bird does good and harm in the proportions of 50 to 7? Not unless the insects mentioned are of equal size or at least of equal capacity for good or harm.[1] Suppose the useful species are large forms which do a great deal of good, and the injurious ones small ones of no consequence. Or if you please, make just the reverse supposition. In neither case do the figures above supply the information necessary to reach a final conclusion. The objection that these authors make to our percentages, apply equally well to their figures — they do not give any idea as to the true economic ratios. Like the percentages they must be interpreted.

The principal variation of the numerical system aside from that of Wilcox, which has previously been discussed, is that used by John Gilmour in his paper [2] on the Wood Pigeon, Rook and Starling. In a review of this paper Professor Beal states: [3] "Mr. Gilmour reckons his percentages from the number of times that the bird has taken the food, and from this concludes that grain and husks constitute 58 per cent of the Rook's food. Insects and grubs

[1] Insects whose economic status depends upon their food habits, and this includes the majority, are very properly reckoned by bulk, for as a rule the larger will do more harm or good than the smaller ones.

[2] Trans. Highland and Agr. Soc. Scotland, 1896, 1–93.

[3] Auk XIV, No. 1, Jan., 1897, p. 10.

reckoned in the same way, amount to 23 per cent. It can hardly be claimed that this is the most accurate method of calculating the relative amounts of food found in a bird's stomach. Birds are fond of eating a great many different things, the aggregate quantity of which may be small, just as human beings eat a little butter and sugar at nearly every meal, but never make a whole dinner of either. To illustrate, in an examination of 2258 stomachs of the Crow Blackbird, corn amounted to 35 per cent of the food by bulk, but when reckoned by the number of times taken it aggregated 52 per cent."

Other illustrations from Professor Beal's work show still greater diversity between percentages obtained by these two methods. For instance spiders were found in 26 per cent of 389 stomachs of *Hylocichla ustulata*, but composed only 1.82 per cent of the stomach contents by bulk. The same data for *Hylocichla guttata* is: spiders were found in 49 per cent of 514 stomachs, but made up only 7.35 per cent of the total contents. Ants, much smaller creatures on the average than spiders, while found in fewer stomachs (249 as contrasted with 254) of the Hermit Thrush, compose a considerably larger volume of the food, namely 12.54 per cent. This fact is just contrary to the normal expectation, and would never be guessed from figures showing merely the frequency of occurrence. The misleading nature of such figures is further shown by the fact that wild fruits found in 243 stomachs somewhat fewer than held ants, compose 26.86 per cent or more than twice as large a proportion of the total bulk of the food. Furthermore caterpillars, occurring in 268 or 52 per cent of the stomachs, and hymenoptera (other than ants), found in 136 or 26 per cent, form nearly equal percentages (within a fraction of one per cent) of the total subsistence.

Beyond showing the futility of Gilmour's particular variety of the numerical system, these instances prove, that frequency notations, no matter whether they refer to systematic or to economic groups, do not indicate the importance of these groups in the diet of the species concerned. Hence they do not suffice for the needs of economic investigations.

Let us see what other objections can rightfully be lodged against the numerical system. In the first place the adherent to this

system deprives himself of the possibility of referring accurately to the contents of a very considerable proportion of the stomachs of birds in general, and probably of a majority of those containing vegetable food. In most cases it is impossible to accurately count the number of individuals of much comminuted animal matter, and practically every stomach containing animal food has a portion of it in this condition. Who can reckon the number of earthworms when only the spicules are left, or caterpillars by the spines, or fishes or moths by their scales? Evidently figures cannot be applied to ground up oats, wheat, corn, and their young shoots, nor to fruit pulp, nor to berries containing an indefinite number of seeds. Who can tell from an inspection of the contents of the stomach how many apples, peaches, or grapes a bird has bitten into, or how many strawberries, blackberries or figs it has sampled? Hence a very important feature of economic work, in fact the most important from the standpoint of the farmer, cannot be expressed by the numerical system. This fact alone proves the inadequacy of the method. It is noticeable that Mason was unable to carry out his intention as to counting all items, particularly in the case of *Ficus* fruits, and of various buds and shoots. Neither can he refrain from using expressions denoting bulk proportions of food.[1]

King for the best of reasons takes no cognizance of vegetable food in his tables, but has the audacity to condemn the percentage system almost in the same breath. As an example of the way King's methods work out, we may quote his account of the food of the Blue Jay (*l. c.* p. 540). "Of 31 specimens examined, 19 had eaten acorns; 15, 30 beetles, among them several species of *Harpalidæ* and a *Cetonia;* 2, 2 caterpillars; 2, 2 grubs; one, some other larvæ; 2, grasshoppers; 5, corn; one, wheat; and one berries. No stomach was found to contain only insects; and of those which contained beetles, their remains never composed more than one-fifth of the entire contents, and usually less than one-tenth." Thus King could not count the individuals of 6 out of 9 items of food in stomachs of Blue Jays, and must express himself in percentages, in order to explain that the item — beetles — apparently

[1] See particularly the accounts of *Molpastes bengalensis, Oriolus kundoo, Acridotheres tristis, Sturnopastor contra, Turtur suratensis T. risorius,* and *Francolinus vulgaris.*

second in importance, "never composed more than one-fifth of the entire contents [of stomachs], and usually less than one-tenth."

It should be pointed out also that the numerical system would be of no use at all in the case of a majority of mammal stomachs as the food is so finely ground. Comminuted food presents no great obstacles to percentage estimation, however, as nearly all of its can be reckoned in the account by this system. Lord Kelvin has said "When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind; it may be the beginning of knowledge, but you have scarcely in your thoughts advanced to the stage of science." It follows therefore that a method of estimating bird food which is powerless to express anything about a considerable portion of the food, has "scarcely advanced to the stage of science."

Under the numerical system, the tendency is for insects or other food elements with very resistant parts to get an undue representation among the items contained in the stomachs. For instance the mandibles of grasshoppers or of beetles or certain stony seeds may persist in the stomach while one or more meals following that from which they are derived, have been eaten and digested. When numbers only are used we must count one insect for each pair of mandibles, and it often happens that the numerical majority of the insects in a stomach, form but a small proportion of the food. Under the percentage-by-bulk system the error due to the presence of relics of past meals, is reduced to the minimum.[1]

The reason is that in examining large series of stomachs inequalities of size tend to balance each other. The insects being entire, a grasshopper will equal in bulk say 10 of a certain species of carabid beetle, but another stomach may contain the jaws of 20 or more grasshoppers and only one of the carabids, which, however,

[1] It should not be understood from this and following remarks, that the writer believes in the long persistence of food particles in birds' stomachs, for his position is just the reverse. What is meant is that in the great majority of birds, digestion is a continuous process, and what may be termed a meal, *i. e.* a stomach full of freshly taken food, is generally accompanied by the harder portions of one, or perhaps more than one previous "meal." It is probable that only in rare cases is any particle of food retained in a stomach more than a few hours.

will exceed the former in bulk. If only the tibial plate of a grasshopper is present, a mosquito will far exceed it in size, and will get a correspondingly greater percentage. Under the numerical system we would write down one grasshopper and one mosquito, and none could guess that the mosquito was a real component of the present meal, and the grasshopper a mere trace of a meal gone by. A small ant may thus surpass in bulk the remains (accessory genital glands) of several much larger moths, and so on. Long series of stomachs, taken in many localities at all seasons, tend to smooth over the irregularities due to differences in size. This happens because the present meal being greatest in bulk always gets chief recognition, and past meals represented by mere traces, receive little or no percentage valuation. A large series of stomachs yields many present meals of all the important food elements. Each of these elements therefore is represented in the stomachs by numerous freshly taken specimens which receive full percentage allowance, as well as by residual traces which add little to the total proportion. Approximate proportionate representation is thus assured.

On the other hand if we use the numerical system, an insect or other food item receives the same recognition if represented by a mere trace as it would if entire. In summing up the food of a number of individuals therefore, instead of getting a cross-section as it were of the various typical meals, we get records of the more durable elements of meals piled on each other, until an entirely false idea of the food is obtained.

Dr. Fisher justly observes that this is not the case with the majority of the birds of prey, which disgorge the less digestible remains of each meal, leaving the stomach entirely empty. It is probable that a numerical system is better adapted to stating the food of these birds than of any other group.

In the writer's opinion the estimation of the percentage of food items by bulk, logically rests on the firm foundation of a bird's natural requirement of a certain average quantity of food per day. A bird, just as a man, needs a certain food value, or number of calories per day,[1] and in the long run, this is obtained from a

[1] Dieticians make their computations on the basis of weight, and one economic ornithologist — Rörig of Germany — has used dry weights in part of his work. But these methods consume much time and are probably unnecessary for the degree of accuracy now required in economic work. Estimation of bulk percentages comes nearest in scientific accuracy to weighing.

certain average bulk of food. We thus have for each species a standard of food consumption, by which we can computate its demands for any multiple or fraction of the standard period. The number of insects, seeds, etc., consumed cannot be so standardized. This is true partly because, many of the items cannot be counted (as explained above), and partly because the elements of food vary so much in size. Thus a bird may take as a certain proportion of its subsistence, 10 grasshoppers, or it may take instead 50 beetles, or 1000 ants. In view of this fact what does it mean to say so many birds took a certain number of beneficial and a certain number of injurious insects. Can we possibly learn by numbers their relation to the whole food? It is perfectly evident that a bird requires, not a certain number of insects and seeds per day, but a certain average bulk of food, which may be made up of an exceedingly wide variety of items of very diverse sizes. It follows therefore that we can estimate the importance of any element of the diet, only when we know its proportion to the standard requirement.

We must express ourselves in terms of bulk also when we desire to state the amount of damage done to crops. The cultivator wishes to know how many quarts of cherries or pecks of grain the birds are apt to destroy in a year. We can make these estimates with greatest accuracy when we know the proportion of the annual food of birds, composed of these items.

Suppose, using the numerical system, we say we have examined 100 Crow stomachs and found in them 675 kernels of corn. What does this mean? Can we learn by a numerical comparison with the grasshoppers, or acorns eaten, what proportion of the yearly food consists of corn? The case is different if we can say that corn constituted 15 per cent of the food of these 100 Crows. We then know something about the Crows' relative taste for corn, know that they could have taken much more, but chose to eat other things. The farmer in the locality in which they were collected knows from such a statement about what damage he may expect from Crows.

Without the percentage-by-bulk system the writer would have been unable to make the following statements [1] regarding the food of the Black-headed Grosbeak, namely: "that the animal food of

[1] Bull. 32, Biol. Survey, 1908, p. 76.

the Black-head, consisting almost wholly of injurious insects, is practically twice the bulk of the vegetable food, or more than four times that portion which is pilfered from man"; and that "for every quart of fruit eaten, more than 3 pints of black olive scales and more than a quart of flower-beetles, besides a generous sprinkling of codling moth pupæ and cankerworms fall prey to this grosbeak."

The percentage-by-bulk system has a further advantage in that it indicates approximately the proportion of the total feeding time a bird spends in eating the various elements of its food. For instance, if we state that a certain Blackbird spends about half its time eating grain, as we may with approximate truth if 50 per cent of its food is grain, we present this fact in a much more graphic way, than we would be able to do, were our knowledge confined to the number of kernels contained in a series of stomachs. The writer expressed this idea in a slightly different form when writing about the food of wild ducks. He then said:[1] "Although on first thought a percentage of less than 5 for wild rice may seem small it really means that these 16 species of ducks get a twentieth of their annual subsistence from this grain; in other words, the quantity they eat would support them for two and a half weeks, if wild rice were fed upon exclusively. Similarly, wild celery, which forms 6.65 per cent of their food, would suffice for three and a half weeks; and pondweeds, which form 13.88 per cent, for more than seven weeks."

These illuminating expressions of the importance of various items of bird food are impossible under any numerical system. Neither does a numerical system supply the basis for graphic representation of the proportions of bird food, such as the sectors of circles method devised by Judd,[2] the curve plottings introduced by Professor Beal,[3] or the shaded columns used by the writer.[4]

The chief beauty of the percentage system however is that it permits those comparisons of one part of a bird's diet with another part, or the food of one species or group of species with that of

[1] Circular 81, Biol. Survey, 1911, p. 2.
[2] See Yearbook U. S. Dep't of Agriculture, 1900.
[3] See Bull. 13, Biol. Survey.
[4] See Bull. 23, Biol. Survey, 1905, p. 29.

another, which are a *sine qua non* in scientific economics. It means so little to say for instance as Mason does: "Of 110 insects taken by 35 birds [Common Mynah], 58 are injurious, 5 beneficial and 47 neutral," (p. 103) and "of 39 insects taken by 14 birds [Pied Mynah], 1 is beneficial, 25 injurious, and 13 neutral." (p. 109). How can the import of these figures be judged unless they are put into proportions? And they cannot be so compared, from the data given, since the insects are of many sizes, and consequently of varying economic importance.

But when we read that weed seeds form 36 per cent of the annual food of the Cardinal and 15 per cent of the diet of the Rose-breasted Grosbeak, we can appreciate at once the comparative value of weed seed as food to these two birds, and the rank of the species as destroyers of weed seeds. Citation of long lists of the numbers of neutral, beneficial and injurious insects which are not susceptible of direct comparison, soon confuses the mind, while the same facts expressed in percentages have directness and clearness obtainable in no other way.

Professor S. A. Forbes, the pioneer economic ornithologist, whose skillful laboratory work and clear thinking, laid so firm a foundation for subsequent workers in this field, adopted the percentage-by-bulk method. He explains [1] that in stomach examination "opportunity is afforded for careful and trustworthy estimates of the ratios each element bears to the other, so that the average significance of the food can be discovered. Practically, this is indispensable. Whatever method fails of this, while its results may be interesting, and may have a certain general value, can never afford a basis for anything better than indefinite opinion. It can never settle the case for or against the birds.

"This method, while by far the best of the three, has its slight disadvantages. Some things eaten by birds leave no appreciable trace in the stomach. For example, it is difficult, by this method, to determine with certainty those birds which greatly injure grapes by breaking the skin of the fruit and sipping the juice. This difficulty applies only to liquid food. Other errors may arise from the shorter or longer periods for which different kinds of food will last in the stomach; but of this we have no proof. I have

[1] Bull. Ill. State Lab. Nat. Hist., Vol. I, No. 3, 1880.

depended almost entirely on this....method of investigation, because it is evidently the most profitable and reliable, and because the method of cursory observation having been resorted to heretofore, most of the recorded facts are due to it. So far as one method could correct the deficiencies of the other, it was desirable that this more tedious and laborious but more fruitful one should be given greater prominence." (pp. 87–88).

The volumetric method of stomach analysis has twice received official sanction by the Biological Survey. In 1895 Professor W. B. Barrows wrote that "In the case of a bird which eats insects only it might be possible to use the numerical method with some accuracy; yet even then much would have to be left to individual judgment in estimating how many small insects were equivalent to one large one, or how many harmful insects would be necessary to offset the consumption of a given number of beneficial insects. Moreover, only under the most favorable circumstances would it be possible to determine just how many individuals of each kind were represented in the stomach contents, for, even if swallowed whole, so soon as digestion begins the individual insects become dismembered, crushed and broken, and within a short time only the hardest parts, such as heads, wing covers, legs, and jaws, remain in recognizable condition.

"It has seemed best, therefore, in attempting to determine the proportions of the various food substances in Crow stomachs, to depend upon the method of equal masses or bulks, which method is adopted in the present bulletin. In most cases the number of individual seeds, insects, or other animals has been recorded also, but these numbers have not been considered in determining percentages." [1]

In 1901 Dr. Sylvester D. Judd in describing the process of stomach examination said: "After each element in a bird's stomach has been identified and placed in a separate pile, the percentages of the different elements are estimated by volume. (Of course it must be understood that mathematical exactness is not attainable in these examinations; but every possible means is taken to reduce the error to a minimum, and with a sufficient number of stomachs a very correct idea may be obtained of the proportions of the

[1] Bull. 6, Biological Survey, 1895, pp. 28–29.

different elements of the food.) [A footnote in original]. In recording the results of examinations a separate record is made for each species and for each month. Monthly averages are based on the number of stomachs collected in the month, but yearly averages are determined from the monthly averages; for unless the collections of stomachs were much more evenly distributed as to months than they are at present, an average based directly on the number of stomachs collected in the year would be misleading."

The results would be just so much more accurate if the abundance and distribution of material warranted reduction of the time-unit to a week, or better a day. The writer has proposed also, as a further step toward accuracy, to reduce the disturbing effect of peculiar local conditions by averaging the contents of stomachs collected in one locality in the same month, and giving such averages (of more than a certain minimum number of stomach contents) equal weights in the monthly tabulation.

Summary.

The principal objection to the method of reckoning the contents of bird stomachs solely by the number of individual insects or seeds, is that the method takes no account of size of the objects, and hence conveys no idea to those unacquainted with the groups concerned of the relative importance of the foot elements.

Size has much to do with economic status — i. e., capacity for good or harm — and it receives proper recognition only under the percentage-by-bulk system.

We have shown furthermore that statements as to the frequency with which certain food items are taken by birds, by no means indicate the importance of these items in the diet of the species. Under the volumetric method however, the proportions the various elements contribute to the animal's subsistence are evident at a glance, and the animal's capacity for good and for harm are clearly shown.

Numerical notations in most cases greatly exaggerate the im-

[1] Bull. 15, Biological Survey, 1901, pp. 14–15.

portance of elements of the food that have parts very resistant to digestion, a difficulty which is reduced to the minimum when proportions are estimated according to the volumes.

Numerical systems are not sufficiently comprehensive. Finely comminuted, fleshy, or pulpy food, or food occurring in indefinite masses cannot be reckoned by numbers. Under the percentage-by-bulk system, all food can be included in the computations. Intelligible comparison of one part of the diet with another or of the food of one species or group of species with that of another, as well as graphic representation of the proportions of the food, are only possible when the volumetric method is used. This system is the better therefore, as the more complete is always superior to the less.

On the other hand statements of the frequency of occurrence of food items in bird stomachs may perhaps be taken as rough indices of availability of the food or of relish for it. And statements of the number of individuals in stomachs have an interest as "records," the interest being in direct proportion to the bigness of the number.

The ideal system from the writer's point of view is one that combines the good points of both the numerical and volumetric methods — a system which, as a matter of record, counts individuals as far as possible, or at least in enough instances to assure the inclusion of typical cases, and which further estimates the proportion of all important items by bulk. Such a system has been approved and used by Forbes, Beal, Barrows, Kalmbach, Judd, Sanderson, Dearborn, Weed and the writer, among American investigators. The consistency with which it has been applied is in striking contrast to the vagaries of numerical systems which have scarcely been used alike by any two writers. We have shown that the chief criticisms that have been aimed against the volumetric system, apply equally well to the numerical methods. The latter have other weak points that do not appear in the percentage-by-bulk system, and the few good points peculiar to the numerical system can profitably be combined with the volumetric method. This gives us a compromise technique that contains all of the good features and a minimum of the weaknesses of its components.

THE BREEDING BIRDS OF SOUTHERN CENTER COUNTY, PENNSYLVANIA.

BY RICHARD C. HARLOW.

THE object of the present paper is to set forth in a systematic way, the results achieved by the author during four years of systematic ornithological investigation in southern Center County, Pennsylvania. The period covered by the observations is from September 1, 1908, to May 20, 1912, with the exception of the summers of 1909 and 1910, when field work stopped about June 10. Observations were made in eastern Ferguson township; Patton township, southeast of Buffalo Run; College township, and the western and southern parts of Harris township. A few records are included in this paper which are based on data collected in parts of Jackson and Brown townships, Hundington County, near the Center County line, which seems legitimate since the physiography of the adjoining parts of the two counties is essentially the same and moreover, all the species nesting in this part of Huntington County, with one exception, have been found in the adjacent regions of Center County.

So far as identification of species and authenticity of the records are concerned it has been the policy of the author to include no record of which there is the slightest doubt, as misleading statements and erroneous identification are all too common at the present time. A hypothetical list is given where are placed various species whose status is not beyond question and other species, not found as yet, but whose occurrence as breeders is to be hoped for in this locality. The data gathered represent the work of a vast number of field trips during the last four breeding seasons. Certain regions, especially Stone Valley, Hundington County; Tussey Valley, Center County; and all of College township, Nittany Valley have been studied quite extensively and the list for these localities is probably nearly complete.

Up to the present time there has been very little published on the birds of this section, and that little has undoubtedly been misleading to a certain extent. A previous paper on this subject

contains many errors and statements that will not stand the test of true scientific questioning, although all credit is due its author and much of his work is of great value. Mr. W. E. C. Todd of Pittsburg made a number of observations here about 1895, but with the exception of Mr. Todd and Mr. Musgrave, practically no ornithological work has been done in this region until Mr. Foster White and the author began their studies in 1908. The previous lack of data, in many respects made the work all the more pleasing for every observation was of value.

According to Bulletin No. 10 of the Bureau of Biological Survey, U. S. Department of Agriculture, all of Center County lies in the Alleghanian faunal area of the Transition Zone. However, since that time, Mr. Samuel N. Rhoads in his "Mammals of Pennsylvania and New Jersey" includes all of Center County northwest of the Bald Eagle range, in the Canadian Zone, and all southwest of this range in the Alleghanian. The truth would seem to lie between the two, and the author believes that here as in other sections of the Pennsylvania mountains where primeval conditions are rapidly changing, we find a remarkable overlapping of faunas. It is essentially a region of unexpected realities and unrealized expectancies, where Canadian and Carolinian species nest side by side. Here we find the Tufted Tit summering in the same ravine as the Magnolia Warbler while even more striking is the sight of the Acadian Flycatcher and the Canadian Warbler feeding their young in neighboring bushes. Southwest of the main ridge of the Alleghanies, Stone Valley, Hundington County, and Bear Meadows, Center County seem to approach nearest to the typical Canadian Life Zone, but even in these places many boreal species are lacking and many austral species are present to disprove this statement.

Center County occupies the very center of the state of Pennsylvania, the 'Keystone of the Keystone' as it were, and stretches away like an irregular lozenge with the oblong ends pointing northeast and southwest. It is bounded on the northwest by Clearfield County; on the northeast by Clinton, Union and Snyder; on the south by Hundington and by Blair on the southwest. Its area is 1230 square miles, thus making it the largest county in the state. The Bald Eagle Mountains divide the county nearly in half; to the northwest, stretches the main ridge of the Alleghanies; to the

southwest the country is rolling and mountainous with several broad valleys. Most of the appended data was collected in the Nittany Valley and along the Hundington County line. This region is remarkable for its lack of large bodies of water, and this feature accounts to a great extent for the few water birds which nest here and also for the fact that the bird life is most abundant in the valleys along the mountain streams. A detailed account of several places which have been marked by certain types of bird life follows so that the reader may better understand the various allusions to these localities.

Some two miles to the west of State College we find the "Barrens" a peculiar tract of land with sandy soil and underground drainage. The original stands of lumber were cut years ago and repeated fires have kept down reproduction so that now we find a tract, miles in extent with a dense second growth of scrub oak, white oak, pitch pine and quaking aspen. Here and there we see scattered patches of woodland but the region is featured by its dense undergrowth and lack of large timber.

About one mile to the northeast of State College, Thompson's spring gives rise to a creek, locally known as Sand Run. Just below Center Furnace this creek is bordered on the southeast by a marsh, several acres in extent. A luxuriant growth of marsh grasses, marsh marigold and reeds, along with a few bushes and cat-tails, make the location a paradise for swamp-loving birds. The water varies from one to twenty-four inches in depth with an average of perhaps four inches.

Between the first and second ridges of the Seven Mountains, lies the narrow first valley with its streams bordered by masses of rhododendrons and a few scattering hemlocks, mute witnesses of the greed of the lumberman. Farther up on the ridges we find groves of pitch pine and Table Mountain pine, chestnut oak and red oak.

Farther back in the mountains between the third and fourth ridges lies the section known as Bear Meadows with an altitude of 2200 feet. Here pitcher-plants, sundews and cranberries grow in profusion while the black spruce and balsam recall at once the northern bogs. The undergrowth consists of an almost impenetrable jungle of rhododendron, and here yet linger the bear, the deer, and the porcupine, secure in their mountain retreat.

Farther down the valley and across the line in Hundington County we find the section known as Stone Valley. The population is sparse and many of the residents consider it an event of their lives to visit State College, only eleven miles away. Here Laurel run wends its way through dense rhododendron thickets with a scattering shade of hemlock, mostly second growth, black birch and yellow birch. Several slashings occur along the old lumber roads where the undergrowth is almost impenetrable and where we find occasional giant dead hemlocks still standing, spurned by the axeman on account of some defect.

The typical woodlot of the region is composed of black and scarlet oaks, shagbark and white hickory, pitch pine and white oak. Several stands of white pine occur, but mostly as second growth.

It is the desire of the author to express his thanks especially to Mr. Foster White, to whose conscientious and indefatigable labors much of the success of these investigations is due. Mr. David Harrower has also given me free access to his notes on the birds of this region, many of which are of great value. Thanks are also due to Messrs. Douglass Spencer, Herbert Mathers and Frank Craighead for valuable assistance, and lastly, the author wishes to thank Professor W. R. McConnell of the Department of Zoology of State College for the assistance and encouragement he has always so willingly tendered.

The list of breeding birds of southern Center County follows.

1. **Butorides virescens virescens.** GREEN HERON.— Regular and fairly common summer resident in suitable locations. Prefers small groves or orchards in the vicinity of water and usually nests in the highest branches. Have examined two nests in this vicinity. The first was found May 22, 1909, and was built 25 feet up in the top of an apple tree in an orchard. It contained five fresh eggs. The second nest was found after the young had flown and was 30 feet up in a box elder, in an open grove along a stream. Both were near Thompson's spring.

2. **Rallus virginianus.** VIRGINIA RAIL.— Regular and common summer resident in the swamps at Center Furnace and probably elsewhere. In 1909 three sets of ten eggs each were collected here on June 7. One set was fresh and the others far incubated. In 1910 the birds were present but no extended search was made for their nests and in 1911 one set was found at the same place and one set of 10 eggs was taken May 28, 1912. They choose the drier parts of the marsh in which to nest while the Sora

Rail usually builds over deeper water. Sets are usually complete by June 1, and the female commences incubation with the first egg laid.

3. **Porzana carolina.** SORA.— Regular and apparently more common summer resident than the Virginia Rail, in the same swamp. The Sora Rail usually builds several nests which are either used as shams or abandoned before the eggs are laid. The following occupied nests have been found.

June 7, 1909. Ten fresh eggs.
June 7, 1909. One fresh egg.
June 7, 1909. Six hatching eggs, three newly hatched Rails.
June 6, 1910. Eleven far incubated eggs.
June 6, 1910. Nine far incubated eggs.
May 28, 1912. Twelve fresh eggs.

In 1911 the birds were seen in their usual numbers but no search was made for their nests.

4. **Philohela minor.** WOODCOCK.— Regular and fairly common summer resident in the swampy bottomlands in the mountains. Has been noted throughout every breeding season in the vicinity of Stone Valley and Bear Meadows. April 29, 1911, Mr. White and I observed four male Woodcocks giving their aërial flight song in the twilight near Stone Valley. The locality was in the bottom-lands of Laurel Run which are largely covered with second growth. Mr. Douglas Spencer found a female with four newly hatched young in this vicinity, May 15, 1911.

5. **Actitis macularia.** SPOTTED SANDPIPER.— Common summer resident; found about all creeks and bodies of water in the open country, but usually nesting back from the water in cultivated fields or bushy pastures.

6. **Oxyechus vociferus.** KILLDEER.— The same remarks apply to this species though it is usually more noticeable than the Spotted Sandpiper. Nests almost entirely back from the water in the cultivated fields.

7. **Bonasa umbellus umbellus.** RUFFED GROUSE.— An abundant permanent resident throughout the mountains and also found commonly in the Barrens. During late April, the drumming may be heard throughout the day in these localities and the birds are frequently flushed. Though the birds are abundant, but two nests have come to my notice. One of these was found by a student while trout fishing near Pine Grove and held ten hatching eggs on May 23, 1910. The other was found by Mr. David Harrower and held six fresh eggs in June, 1911.

8. **Meleagris gallopavo silvestris.** WILD TURKEY.— Regular and tolerably common permanent resident, though rarely seen. I have observed Wild Turkeys or their tracks in the Barrens, near Stone Valley and along Mount Nittany, and the birds breed in all these localities. They are reputed to be fairly common near Buffalo run in Patton township and the farmers tell me that they frequently see the young in company with the parent feeding in the open fields near the woods.

9. **Zenaidura macroura carolinensis.** MOURNING DOVE.— Quite

common summer resident throughout the region and nesting in all localities except the deep woods. Found quite commonly about old estates in pines, in old orchards or in open groves of pine in the mountains. Has been found breeding from the ground up to twenty-five feet, usually at the base of limbs but sometimes in hollows. Eggs have been found as early as April 17, 1910, and as late as July 23, 1911, in the latter instance they were far incubated.

10. **Cathartes aura septentrionalis.** TURKEY VULTURE.— The Turkey Vulture may usually be seen on any day throughout the summer, and undoubtedly breeds at certain localities in the mountains though no nests have been found. During late June the author has observed them frequently about Bald Knob and sailing over the Tussey Valley and has sought vainly for their nests in the rock ledges at Shingletown Gap.

11. **Accipiter cooperi.** COOPER'S HAWK.— The most common breeder of our larger hawks. Nests regularly either in the larger woodlots through the more open country or in the denser mountain forests. The following occupied nests have been found.

May 4, 1909. Four slightly incubated eggs.
April 28, 1910. Five fresh eggs.
May 14, 1910. Four incubated eggs.
May 2, 1912. Three fresh eggs.

Two nests were located while in the process of building in 1911, but circumstances prevented later investigations.

12. **Buteo borealis borealis.** RED-TAILED HAWK.— An uncommon permanent resident. The author has not found the nest of this bird, though he has several times observed it in the breeding season. Mr. Douglass Spencer informs me that he observed several of these birds in early April, 1911, near Fillmore.

13. **Buteo platypterus.** BROAD-WINGED HAWK.— A regular but rather scarce summer resident; its range apparently limited to the vicinity of the mountain streams in the gaps and ravines. The Broad-winged Hawk has been observed in the breeding season in Stone Valley, Shingletown Gap, in Bear Meadows, and near Pine Grove Mills. The following nests have been found.

May 8, 1910. Two fresh eggs.
July 1, 1911. One downy young hawk probably ten days old.

Both these nests were on the banks of mountain streams, the first in a hemlock and the second in a dead yellow birch.

14. **Falco sparverius sparverius.** SPARROW HAWK.— Common summer resident throughout the open country, nesting either in solitary trees or in small woodlots. The Sparrow Hawk always nests in a hollow, but the size may vary from a small Flicker's hole to an enormous natural cavity, two feet in diameter. A number of nests have been found — the earliest with five half-incubated eggs on April 26, 1910, near Lemont and the latest with four slightly incubated eggs on May 27, 1910, near State College.

15. **Otus asio asio.** SCREECH OWL.— Common permanent resident throughout the open country. In spite of the fact that the author has found but one nest, he has often seen the young birds still in the down and at least two pairs breed on the College campus. Screech Owls here show a marked preference for holes in old orchard trees and in large elms along the creeks. The gray form is more prevalent here. A nest with three eggs found April 13, 1912.

16. **Bubo virginianus virginianus.** GREAT HORNED OWL.— A rare but regular permanent resident apparently restricted to the wilder mountainous regions. It has been noticed in the vicinity of Bald Knob, Bear Meadows and Stone Valley. In spite of diligent search, no nests have been found, but the birds have been seen Feb. 25, 1910, during their breeding season near Monroe Furnace.

17. **Coccyzus americanus americanus.** YELLOW-BILLED CUCKOO. — Regular, but rather uncommon summer resident, most frequently found in second growth, or damp thickets in the more open country where it breeds.

18. **Coccyzus erythrophthalmus.** BLACK-BILLED CUCKOO.— Scarce summer resident, the more frequent form in the thickets and second growth of the mountainous regions in the vicinity of Bald Knob, Bear Meadows and Stone Valley.

19. **Ceryle alcyon alcyon.** BELTED KINGFISHER.— Regular and fairly common summer resident in suitable localities throughout the more open country. Rarer along the mountain streams. The Kingfisher builds either in the banks of streams or less commonly in quarries or sand banks remote from water. The following nests have been found.

May 22, 1909. One fresh egg.
May 11, 1910. Six fresh eggs.
May 18, 1912. Seven incubated eggs.

20. **Dryobates villosus villosus.** HAIRY WOODPECKER.— Scarce permanent resident in the larger bodies of timber; most frequently found along the base of the mountains. It has been noted throughout the breeding season near Pine Grove Mills, in Stone Valley and along the base of Mount Nittany, near McBride's Gap and at Waddles.

21. **Dryobates pubescens medianus.** DOWNY WOODPECKER.—A very common permanent resident in the open country, but its nests are difficult to find. During the breeding season it is most frequently observed in woodlots, groups of trees near streams, or in orchards. In the mountains it is uncommon. We have noted but two nests. The first was found May 30, 1909, and contained four half fledged young, while the second held a completed set of 5 eggs on May 19, 1912.

22. **Phlœotomus pileatus abieticola.** NORTHERN PILEATED WOODPECKER.— A scarce permanent resident now restricted to the mountainous districts and the wilder portions of the barrens. The extreme shyness of these birds renders observation most difficult. The Pileated Woodpecker occurs regularly throughout the breeding season in the wild, almost im-

penetrable swamps and slashings of Stone Valley and Bear Meadows. One nest with two fresh eggs was found May 2, 1912.

23. **Melanerpes erythrocephalus.** RED-HEADED WOODPECKER.— An abundant summer resident throughout the open valleys, nesting in practically every woodlot and orchard about State College and the adjoining towns and sometimes raising two broods in a season. From a number of nests examined, the earliest with six fresh eggs was found May 26, 1910, and the latest with four fresh eggs on July 10, 1911.

24. **Colaptes auratus luteus.** NORTHERN FLICKER.— An abundant summer resident throughout the open valleys nesting most frequently in orchards and woodlots. Less common in the more open mountain forests. Earliest nest examined held eleven eggs on May 9, 1910; latest nest June 7, 1910, with seven fresh eggs. The average date when sets are completed is May 12.

25. **Antrostomus vociferus vociferus.** WHIP-POOR-WILL.— Quite common summer resident throughout the mountain forests. It apparently does not breed in the more open country.

26. **Chordeiles virginianus virginianus.** NIGHTHAWK.— Rare summer resident in the open country. Found about old fields where there is an outcrop of flat stones.

27. **Chætura pelagica.** CHIMNEY SWIFT.— The Swift is an abundant summer resident throughout the open country about houses and, in fact, wherever suitable chimneys are found where it may nest. Large numbers breed in the capped chimneys of the chemistry building on the College campus.

28. **Archilochus colubris.** RUBY-THROATED HUMMINGBIRD.— Regular but rather scarce summer resident in the open valleys as well as along the borders of the mountain forests. In the open country it breeds about estates, in woodlands and in orchards. I have found but one nest, which contained two fresh eggs on June 7, 1909. This was built in the College orchard.

29. **Tyrannus tyrannus.** KINGBIRD.— Abundant summer resident of the open or cleared valleys, where it nests in nearly every fruit orchard. The average time for complete sets of eggs is about June 6.

30. **Myiarchus crinitus.** CRESTED FLYCATCHER.— Very common summer resident throughout the valleys and open woodland, nesting most abundantly in old apple orchards. The usual time for complete sets of eggs is about June 5.

31. **Sayornis phœbe.** PHŒBE.— Very abundant summer resident, nesting indiscriminately about out-houses, barns, ruined buildings, under bridges or on the sides of rock ledges in the mountains. Near Pine Grove in an old ore furnace, a nest of Phœbe was found with six distinct stories. Average time for first sets April 28.

32. **Myiochanes virens.** WOOD PEWEE.— Abundant summer resident, nesting usually in open woods, orchards or about estates. But three nests have come to my notice.

No. 1. June 20, 1911. Two fresh eggs.

No. 2. June 29, 1911. Two fresh eggs.

No. 3. August 7, 1911. Two half fledged young.

33. **Empidonax virescens.** ACADIAN FLYCATCHER.— Rare summer resident along the mountain streams. Have observed it several times in 1910 in Hundington County where two old nests were found. In July, 1911, a female with two young was seen between First and Second mountains.

34. **Empidonax minimus.** LEAST FLYCATCHER.— Rare summer resident in small groves or fruit orchards. Usually about one pair is seen throughout the breeding season but no nests have been found.

35. **Octocoris alpestris praticola.** PRAIRIE HORNED LARK.— Summer resident in the open fields of the valleys, varying in abundance. In 1909 and 1912 they were fairly common, while in 1910 and 1911 they were very rare. No nests have been found though the birds have been observed in every month of the year.

36. **Cyanocitta cristata cristata.** BLUE JAY.— Regular but scarce summer resident in the wooded areas, most frequently found along the mountain trails. A nest with five eggs was found in Stone Valley, May 8, 1910.

37. **Corvus corax principalis**. NORTHERN RAVEN.— Rare but regular resident in the wilder sections, nesting in ledges of rocks. Usually has complete sets by March 5. (*Cf.* Cassinia, 1910, p. 11.)

38. **Corvus brachyrhynchos brachyrhynchos**. CROW.— Very abundant breeder, being especially abundant in the medium sized woodlots in the valleys. Incubation begins about April 10, the eggs numbering four or five.

39. **Molothrus ater ater**. COWBIRD.— Breeds regularly but infrequently throughout the open valleys, laying from May 20 to June 5. In this region its eggs have been found in the nests of the Chipping Sparrow, Red-eyed Vireo, White-breasted Nuthatch, Phœbe and Bluebird.

40. **Agelaius phœniceus phœniceus**. RED-WINGED BLACKBIRD.— Breeds abundantly throughout the open country wherever there are any small swamps, several pairs often nesting close together. The complete set of three or four eggs is laid from May 20 to May 25.

41. **Sturnella magna magna**. MEADOWLARK.— Abundant summer resident in grassy fields through the valleys, but its nests are hard to find. Nesting begins the first week in May and two broods are reared.

42. **Icterus spurius**. ORCHARD ORIOLE.— Scarce but regular summer resident in orchards and about estates. I have seen two nests and both Mr. White and Mr. Harrower have found nests with young in late June.

43. **Icterus gabula**. BALTIMORE ORIOLE.— Breeds abundantly in orchards, about estates and especially in elms along streams. Here four eggs are the normal set, while three and five are found less frequently. The eggs are laid about May 25.

44. **Quiscalus quiscula quiscula**. PURPLE GRACKLE.—

45. **Quiscalus quiscula æneus**. BRONZED GRACKLE.— Both forms of the Grackle have been taken here during the nesting season, but the most common form is intermediate between the two. They nest most commonly in coniferous trees about estates and lay their four or five eggs about May 5.

46. **Astragalinus tristis tristis**. GOLDFINCH.— Breeds abundantly throughout the open valleys, in orchards, about estates and in shade trees as well as in patches of second growth. In 1911 I found sets of from four to six eggs, from July 23 to August 11.

47. **Pœcetes gramineus gramineus**. VESPER SPARROW.— Breeds abundantly in the open fields, showing a preference for high dry ground and raises two broods. In 1911 I took a set of four eggs on July 24.

48. **Passerculus sandwichensis savanna**. SAVANNAH SPARROW.— Breeds rarely in the open fields of the valleys. My only record is a nest and two far incubated eggs which I collected on July 20, 1911.

49. **Ammodramus savannarum australis**. GRASSHOPPER SPARROW.— Breeds abundantly in the grassy fields and meadows throughout the valleys, but I have not found any occupied nests. On July 20, 1911, a deserted nest with one fresh egg was found.

50. **Spizella passerina passerina**. CHIPPING SPARROW.— Breeds abundantly throughout the valleys, in orchards and shade trees as well as in vines about houses, and raises two broods. The first set of three or four eggs is deposited about May 10.

51. **Spizella pusilla pusilla**. FIELD SPARROW.— Abundant, nesting in old weedy pastures and fields, where there are patches of briers or bushes. Raises two broods and the first set of three or four eggs is laid about May 5 — the second set in early July.

52. **Melospiza melodia melodia**. SONG SPARROW.— Breeds abundantly throughout the open valleys. Two or three broods are reared and the four or five eggs may be found from May 1 until late in August.

53. **Pipilo erythrophthalmus erythrophthalmus**. TOWHEE.— Nests abundantly in second growth in the mountains and about clearings and less commonly in the valleys. On July 19, 1911, a nest with three half incubated eggs was located.

54. **Passerina cyanea**. INDIGO BUNTING.— Regular and fairly common breeder along the border of woods and in second growth and clearings in the mountains, raising two broods. But two nests have been found.

August 17, 1911. Four newly hatched young.

August 18, 1911. Three slightly incubated eggs.

55. **Piranga erythromelas**. SCARLET TANAGER.— Rare breeder and confined mostly to the mountains. It has been noted throughout the summer in Stone Valley but no nests have been found.

56. **Progne subis subis**. PURPLE MARTIN.— Breeds rarely and irregularly. In the summer of 1908 two pairs bred at State College, and two pairs bred in 1912.

57. **Petrochelidon lunifrons lunifrons**. CLIFF SWALLOW.— Regu-

lar but not very common summer resident throughout the cultivated sections.

58. **Hirundo erythrogastra**. BARN SWALLOW.— Very abundant breeder throughout the valleys, nesting in barns or under bridges. Usually completes its sets of four or five eggs by May 10 or May 15.

59. **Stelgidopteryx serripennis**. ROUGH-WINGED SWALLOW.— Regular but not very common breeder along the open streams. Four nests have been located at the following dates.

June 11, 1909. Six newly hatched young, in stones under bridge.
June 11, 1909. Five fresh eggs in Kingfisher's hole.
May 30, 1910. Six fresh eggs in Kingfisher's hole.
May 18, 1912. Five fresh-eggs in Kingfisher's hole.

60. **Bombycilla cedrorum**. CEDAR WAXWING.— Common summer resident nesting in orchards and shade trees. Three occupied nests have been located.

June 20, 1911. Three fresh eggs.
June 29, 1911. Three fresh eggs.
August 17, 1911. Four slightly incubated eggs.

61. **Vireosylva olivacea**. RED-EYED VIREO.— Abundant summer resident in open woodland and about estates as well as in the dense woods of the mountains. Nesting begins about the first week in June.

62. **Vireosylva gilva gilva**. WARBLING VIREO.— Rare but regular summer resident, apparently confined to shade trees along the town streets. Have observed them in Boalsburg and State College throughout the breeding season.

63. **Lanivireo flavifrons**. YELLOW-THROATED VIREO.— Scarce but regular summer resident in open woods, at least two pairs breeding regularly on the College campus, where the young birds have been observed in late June. But one nest has been located which contained four fresh eggs on June 2, 1910.

64. **Mniotilta varia**. BLACK AND WHITE WARBLER.— Regular and fairly common summer resident throughout the mountain forests, where its song is one of the features. But one nest has been found, on May 18, 1910, which held five fresh eggs. The locality was Stone Valley.

65. **Vermivora chrysoptera**. GOLDEN-WINGED WARBLER.— Rare summer resident. One pair was observed near Monroe Furnace on June 3, 1910.

66. **Dendroica æstiva æstiva**. YELLOW WARBLER.— Very common summer resident throughout the open valleys, nesting most frequently in orchards.

67. **Dendroica cærulescens cærulescens**. BLACK-THROATED BLUE WARBLER.— Rare summer resident in the colder laurel swamps of the mountains. Has been observed at Stone Valley and Bear Meadows.

68. **Dendroica magnolia**. MAGNOLIA WARBLER.— Fairly common breeder in the hemlock groves of the mountains, being found most frequently at the gaps and along streams.

69. **Dendroica pensylvanica**. CHESTNUT-SIDED WARBLER.— Quite a common breeder throughout, nesting in second growth either in the valleys or in clearings on the mountains. Mr. Harrower has taken several sets of eggs about June 1, near State College.

70. **Dendroica fusca**. BLACKBURNIAN WARBLER.— Scarce summer resident in the more extensive hemlock patches in the mountains.

71. **Dendroica virens**. BLACK-THROATED GREEN WARBLER.— Abundant summer resident wherever patches of coniferous timber occur in the mountains. It is especially abundant at Stone Valley and Bear Meadows and Mr. Harrower found one nest near Bald Knob in late June, 1911.

72. **Dendroica vigorsi**. PINE WARBLER.— Fairly common summer resident in patches of pitch, Table Mountain and white pine in the mountains and valleys.

73. **Seiurus aurocapillus**. OVEN-BIRD.— Abundant breeder wherever there is any woodland, either in the mountains or the valleys.

74. **Seiurus motacilla**. LOUISIANA WATER-THRUSH.— Abundant breeder at suitable locations in the mountains, being especially common in the bottom land of Laurel Run, Stone Valley. Here I have taken several sets of three and four eggs and Mr. Harrower has taken a set of five. My earliest date is for four eggs, taken May 14, 1910, and incubated one week.

75. **Geothlypis trichas trichas**. MARYLAND YELLOW-THROAT.— Common summer resident in swampy clearings and damp undergrowth throughout the country. It is not found in the heavy timber.

76. **Icteria virens virens**. YELLOW-BREASTED CHAT.— Rare summer resident in clearings and second growth thickets. One set of four incubated eggs was collected on June 3, 1910, in Stone Valley.

77. **Wilsonia citrina**. HOODED WARBLER.— Abundant summer resident in the thickets of rhododendron and laurel throughout the mountain bottomlands. It is very common in Stone Valley and breeds as near to State College as Shingletown Gap where several broods of young have been observed.

78. **Wilsonia canadensis**. CANADA WARBLER.— Quite common breeder in the same localities as the Hooded Warbler inhabits. July 1, 1911, I found a nest of this bird near Bald Knob with four full fledged young and at the same place, June 7, 1912, took a set of 5 far incubated eggs.

79. **Dumetella carolinensis**. CATBIRD.— Common summer resident throughout the open country, in thickets and second growth.

May 22, 1909. Four fresh eggs.

80. **Toxostoma rufum rufum**. BROWN THRASHER.— Rather scarce breeder, inhabiting the same localities as the Catbird.

81. **Troglodytes aëdon aëdon**. HOUSE WREN.— An abundant summer resident throughout the valleys, nesting most frequently in old orchards or about houses. The usual time for complete sets is about June 1.

82. **Sitta carolinensis carolinensis**. WHITE-BREASTED NUTHATCH. — An abundant breeder in nearly all the forested portions and woodlots.

But two nests have been taken; one May 16, 1910, which held six fresh eggs and one of the Cowbird; and one May 14, 1912, with 7 fresh eggs.

83. **Bæolophus bicolor**. TUFTED TITMOUSE — Rare summer resident in the woods along the base of the mountains.

84. **Penthestes atricapillus atricapillus**. BLACK-CAPPED CHICKADEE.— Scarce summer resident along the mountain streams. On May 8, 1910, a nest was found in Stone Valley containing seven fresh eggs.

85. **Hylocichla mustelina**. WOOD THRUSH.— Rare breeder and apparently limited to the open, damp bottomlands of the mountains.

86. **Hylocichla fuscescens fuscescens**. VEERY.— Rare breeder in the bottomlands of the mountains. Has been observed twice in the breeding season in Stone Valley.

87. **Planesticus migratorius migratorius**. ROBIN.— Very abundant breeder in the open country, nesting in orchards and about lawns and estates. Sets are usually completed about May 4, and two broods are raised.

88. **Sialia sialis sialis**. BLUEBIRD.— Regular but not very common breeder in the open valleys, nesting most frequently in old orchards. Sets are usually complete about April 20 and two broods are raised.

Hypothetical List.

89. **Botaurus lentiginosus**. BITTERN.— Mr. Spencer observed one specimen in June, 1908, along Laurel Run and Mr. White took one of a pair from the Center Furnace Swamp on May 8, 1909. It probably will be found to be a rare breeder.

90. **Ardea herodias herodias**. GREAT BLUE HERON.— Has been observed several times in April, and may breed in some sections of the mountains.

91. **Colinus virginianus virginianus**. BOB-WHITE.— It has been reported to breed rarely at Boalsburg and Pine Grove, but as yet, I have no corroborative evidence. Several were shot near Pine Grove in October, 1911. One was singing June 24, 1912, at State College.

92. **Circus hudsonius**. MARSH HAWK.— During July, 1911, I saw a bird of this species nearly every day, and again observed one May 6, 1912. It may breed rarely in the swampy meadows.

93. **Accipiter velox**. SHARP-SHINNED HAWK.— Probably breeds rarely in suitable places in the mountains, but as yet no evidence has been procured.

94. **Buteo lineatus lineatus**. RED-SHOULDERED HAWK.— The same remarks apply to this species.

95. **Asio wilsonianus**. LONG-EARED OWL.— This Owl has been taken here in the fall and winter months and may breed rarely.

96. **Strix varia varia**. BARRED OWL.— Probably breeds rarely in suitable localities. Has been observed several times in March.

97. **Dolichonyx oryzivorous**. BOBOLINK.— Mr. Musgrave records a pair observed near Boalsburg by Mr. Todd in June. I have no other records.

98. **Junco hyemalis hyemalis**. SLATE-COLORED JUNCO.— My latest spring record is May 10, 1910. May breed rarely in the mountains.

99. **Melospiza georgiana**. SWAMP SPARROW.— Probably nests rarely at the Center Furnace Swamp but no conclusive evidence has been obtained.

100. **Cardinalis cardinalis cardinalis**. CARDINAL.— The Cardinal may breed in Stone Valley as it has been seen there in May.

101. **Zamelodia ludoviciana**. ROSE-BREASTED GROSBEAK.— This bird occurs in Stone Valley during the migrations and may breed there.

102. **Iridoprocne bicolor**. TREE SWALLOW.— Mr. Musgrave records the Tree Swallow as a common summer resident, but so far, no supporting evidence has been obtained.

103. **Lanius ludovicianus migrans**. MIGRANT SHRIKE.— There is a possibility that this Shrike may breed here and watch should be kept for it.

104. **Compsothlypis americana usneæ**. PARULA WARBLER.— Probably breeds rarely at Bear Meadows, as Mr. Musgrave records them from that locality in June.

105. **Setophaga ruticilla**. REDSTART.— May breed rarely but no conclusive evidence has been obtained.

106. **Thryomanes bewicki bewicki**. BEWICK'S WREN.— One was observed near Shingletown, April 13, 1910. It may breed rarely.

107. **Cistothorus stellaris**. SHORT-BILLED MARSH WREN.— Mr. White and myself observed Marsh Wrens May 30, 1909, at Center Furnace which we referred to this species. It should be looked for in our swampy meadows.

1. SITE OF RED-BREASTED MERGANSER'S NEST.

2. NEST AND EGGS OF RED-BREASTED MERGANSER.

SOME OBSERVATIONS ON THE LIFE-HISTORY OF THE RED-BREASTED MERGANSER, MERGUS SERRATOR, LINN.

BY R. M. STRONG.

DURING the summer of 1911, it was the writer's good fortune to be in a locality where Red-breasted Mergansers were breeding in some numbers. Headquarters were established at Ephraim, Door County, Wisconsin; and islands in Green Bay were explored a number of times. Spider Island and Gravel Island, across the peninsula in Lake Michigan, were also visited with the aid of information kindly furnished by Mr. Henry L. Ward of the Milwaukee Public Museum. All of the wooded islands in this region not occupied by man, were found to have nests of the Red-breasted Merganser. On examination of the literature, later, only fragmentary accounts of the life-history of this bird could be found. As these are also much scattered, it has seemed desirable to collect such material as is available with the observations made by the writer into the following article.

The Red-breasted Merganser is generally described as having a wide distribution in the northern part of the northern hemisphere from Alaska eastward even to Japan and China. It breeds in the northern portions of its range. According to Ridgway [1] there are breeding records as far south as northern Illinois.

All of the nests which were found by the writer were on the ground in scrubby growths or among forest underbrush on islands. Mergansers were seen near the shore of the mainland, under circumstances which suggested strongly that they were breeding there also, but no nests were found on the mainland. The general characteristics of the nests and of their locations corresponded to the descriptions given by the authors of various works on birds.

Nest No. 1 was found June 20 at the base of the bush which appears in Plate XXI, fig. 1. It contained only five eggs at this time, and it consisted as usual of a mass of sticks and débris lined

[1] Ridgway, R. Manual of North American Birds. Also in The Ornithology of Illinois, Vol. II. Part 1, p. 189–190.

with a light gray down which also partially covered the eggs. The down occurred in the usual abundance for nests of this species and presented a comfortable appearance.

Another nest which was found nearby was placed in the midst of a patch of nettles (*Urtica gracilis*) and bushes. Other nests were found in various positions of concealment. One was among nettles alongside a large drift-log. The nest shown in Plate XXI, fig. 2 was at the base of a bush in a position similar to that occupied by nest No. 1, but with a drift log at one side. Still another nest was among some roots of a tree on the side of a bank in a little cave which had been formed by erosion of the soil about the base of the tree. Usually the nests were within seventy-five feet of the water, but one was found over one hundred feet away from water, and some fifty feet or more back in dense woods and underbrush. This nest was well concealed by ground conifers, and the brooding female was flushed at my feet. Except when the bird was flushed suddenly from her nest, the eggs were usually found covered more or less completely with down. Dall [1] states that six nests which were found on an island in the Yukon River, Alaska, near its mouth, were all carefully concealed under dry leaves. He found most of the nests in small hollows under logs of drift wood. It is stated by Meyer [2] that the nest may be placed in a recess many feet deep in a hollow tree. Mr. H. L. Ward, in conversation, told the writer of a nest observed by him in a barrel. Meyer claims that the nest may also be in the top of a tall tree.

Yarrel [3] mentions locations under projecting rocks or in thick brushwood. He describes the nest as being composed of moss and lined with down from the bird, and he notes a similarity of the nest both in structure and in materials to that of the Eider Duck. This resemblance was also noticed by Audubon,[4] but he says that the nest of the Red-breasted Merganser is better-fashioned and considerably smaller. He described the construction as consisting of dry weeds and mosses of various kinds "warmly lined with down from the breast of the female bird."

---

[1] Baird, Brewer, and Ridgway. The Water Birds of North America. Vol. 2, pp. 116–120. Quotes Dall.

[2] Meyer, H. L. British Birds. 1842. Vol. 6, pp. 179–183.

[3] Yarrell, W. A History of British Birds. 1856. Vol. 3, pp. 392–397.

[4] Audubon, J. J. Ornithological Biography. Vol. V, pp. 92–99.

This species was found by Audubon and also by Dawson and Bowles [1] to prefer the vicinity of fresh water for its nesting place.

The number of eggs in a set is stated somewhat differently by various writers. Thus Audubon found frequently six to eight eggs but never more than ten in a nest. Wilson and Bonaparte[2] mention eight to thirteen eggs. A female with eleven young was seen by Osgood [3] in Alaska. The writer's notes include the following records of the number of eggs in nests where there was evidence that the sets were complete:

One nest contained seven eggs.

Four contained nine eggs.

Two contained ten eggs.

According to a number of authors, the female alone incubates the eggs and rears the young. The writer's limited observations, support this view. No males were observed by the writer about the nests, but they were seen in small flocks in the immediate vicinity, and they sometimes flew near. It was not possible to learn whether they were interested in the nests or not. Maynard [4] states that males were not seen during the brooding period, but "later when the downy young were swimming in the neighboring ponds both parents birds were present and exhibited considerable solicitude, flying distractedly about, often swimming within a few yards of me."

Though the writer spent several days in the vicinity of a number of nests after the eggs were due to hatch, the young were never seen at close range away from the nest except in one case when only the female was in view. Two nests were found with young just hatched and with eggs hatching. These will be discussed later in this article. Broken shells were found but the young mergansers were usually not to be seen, and they were presumably hidden in the underbrush.

If the brooding female had not already left the nest before the

---

[1] Dawson, W. S. and Bowles, J. H. The Birds of Washington. Vol. II, pp. 760–762.

[2] Wilson, A. and Bonaparte, C. L. American Ornithology or the Natural History of the Birds of The United States. 1877.

[3] Osgood, W. H. A Biological Reconaissance of the Base of the Alaska Peninsula. North American Fauna. No. 24, p. 55.

[4] Maynard, C. J. The Birds of Eastern North America. pp. 461–462. 1881.

writer landed at the islands where the nests occurred, she flew some distance on being flushed, usually alighting on the water. On several occasions while studying gulls in my tent which had been pitched within a few rods of a merganser nest, the female parent came unconcernedly near. One bird splashed in the water at the shore about one-hundred feet away as though in play or taking a bath. Another waddled by the tent shortly after it was pitched, uttering duck-like quacks as she returned to her nest. On the whole the mergansers seemed to be shy.

In order to study the young more closely than would be possible in the field, some merganser eggs were hatched under a hen. Six eggs were collected on June 26. To keep them warm until they could be placed under a hen, they were carried in a shoe box with three nestling gulls which were also collected on this trip. Three were taken from nest No. 1 which contained only five eggs on the 20th. This nest held nine on the 26th. The other three eggs were obtained from a nest which contained nine eggs both on June 20 and on the 26. This nest will be referred to as No. 2.

The six eggs were placed under a broody hen which was fortunately available at the time on the premises where the writer was boarding. On the morning of July 11, one egg from nest No. 2 was found hatched, and another bird appeared before noon. The third egg did not develope. The writer visited the nest from which these eggs were taken, the next day, July 12, when most of the eggs were found hatched. Apparently the eggs under the hen had made as good progress as those left in the nest with the parent merganser. Two of the eggs from nest No. 1 hatched on July 25, having been under the hen a few hours less than twenty-nine days. This indicates a probable incubation period of about four weeks for the Red-breasted Merganser. Evans[1] in his incubation-period tables quotes Tiedemann as giving 26 to 28 days as the incubation time for this species. (Tiedemann's work has not been accessible to the writer.)

The baby mergansers had the usual attractiveness of newly-hatched precocial birds. The downy young of the Red-breasted

[1] Evans, W. On the Periods occupied by Birds in Incubation. Ibis. 1891, Vol. III, Ser. 6, pp. 52–93.

Merganser have been described by Ridgway [1] as follows: "Above, hair-brown, the posterior border of each wing, and a large spot on each side of the rump, yellowish white; lower parts including the malar region, yellowish white; side of head and neck reddish cinnamon, paler on the lores, which are bordered above by a dusky stripe running backward to the anterior angle of the eye, and below by a dark brown, rather indistinct rictal stripe; lower eyelid white." In place of the term reddish cinnamon we may substitute dull or broken shades of orange-yellow which pass over into light tints of this color. The bill and feet are mostly varying shades and tints of olive or a very much "broken" yellow.

During the first few days and especially on the first day, the down feathers are more or less bristly as their barbs are held together very frequently by feather-germ material. The soft fluffiness which is characteristic of a newly-hatched chick does not appear very fully until a few days later. Nestlings hatched by the parent itself in the field showed the same bristly appearance.

Within a few hours after hatching, the young mergansers became quite active, and the two hatched on July 11, were seen in the late afternoon of that day sitting on top of the hen's back, a location they seemed to attain with little trouble. Cory[2] observed a female merganser bearing a weak nestling on her back and wrote "He scrambled upon her back and nestled snugly down behind her neck....away she went....followed by her brood."

On the next day, the little birds were still more active, and they began to jump towards the upper edge of the box in which the nest was placed. They were also able to move rapidly over the ground, though apparently not yet able to stand on their feet. Locomotion was accomplished by a peculiar wriggling movement of the whole body prostrate on the ground. These movements always suggested those of a snake. When nest No. 2 was visited on July 12, the little mergansers, though apparently not more than a day old and perhaps younger, were very wild; and they were caught with difficulty in the tangle of weeds and brush about their nest. One of these birds was captured and taken home to the hen with her two charges. This third bird appears in the figure which shows

[1] Ridgway, R. The Ornithology of Illinois.
[2] Cory, C. B. A Naturalist in the Magdalen Islands. p. 72.

three downy mergansers. The female parent merganser remained on the nest until the writer was within a few feet, before leaving her family. The nestlings seen in this nest and in another exhibited the type of locomotion just described.

A nest which was found on July 15 contained seven young just hatched and one egg. A companion found the nest and took the writer to it. On our approach, the nestlings began to scatter. All but one were caught and replaced in the nest. During the time which was occupied in making several photographs, the young were kept in the nest by a hat which was placed over them. This was removed an instant for each picture. After a few plates had been exposed, the seventh nestling was observed, more than twelve feet away, approaching through a tangle of nettles and other weeds. We stood as still as possible while the little bird came by the most direct route possible towards the nest until it happened to climb on one of the writers's feet where it was captured to be returned to the nest. Presumably these nestlings had never before left the nest. It would be interesting to know how this bird was able to find its way back and why it returned with two men in plain view from whom it had fled in terror a few minutes before. Its nestmates were not making any noise that the writer could notice.

The three mergansers were removed with the hen to a pen with ample space for exercise, and the other three eggs were placed under another hen. One of these eggs was broken and the other two hatched, as has been said, on July 25. Though apparently strong, one of the young died on the next day and the other a day later.

The problem of what to feed the little mergansers was perplexing. One caught at the nest (No. 2) on July 12, had no food in its stomach, so nothing was gained by this effort to find what the parents were feeding their young. It is commonly stated that the mergansers are fish-eating birds. According to Morris,[1] the Red-breasted Merganser eats small fish, beetles, water insects and their larvæ, worms, and frogs. Meyer[2] mentions small fish, water beetles, insect-larvæ, worms, and sometimes frogs. It is stated by Jones[3] that the young "When first hatched live upon small

[1] Morris, F. O. A History of British Birds. Vol. 5, pp. 239–242.
[2] Meyer, H. L. British Birds.
[3] Jones, T. R. Cassell's Book of Birds. Vol. III, pp. 173–174.

1. RED-BREASTED MERGANSERS, TWO DAYS OLD.

2. RED-BREASTED MERGANSER, THREE WEEKS OLD SWALLOWING A GRASSHOPPER.

crustacea and larvæ, caught upon the surface of the water, but on the third day are able to dive, and from the eighth day are quite capable of fishing for themselves." Robinson [1] found a "small round crab" in the stomach of a male Red-breasted Merganser which was dissected, and more crabs of the same size were seen in the gizzard. All that the writer knew about the food of mergansers when these birds were hatched, was that they eat fish.

As it was not practicable to depend upon fish for feeding the little mergansers, bits of boiled egg and liver were forced into the mouths of the unappreciative and wriggling babies. These attempts met with very little success, and the prospects of rearing any of the birds were not bright. It happened that grasshoppers were exceedingly abundant at the time, and these were tried with success, though one of the birds died on the 13th and another on the 14th. The third began to take the grasshoppers willingly, especially when they were offered by the hen. Two days later, this bird ate eight grasshoppers which averaged over an inch in length, at a single meal. As the writer was away in the field a good deal, the feeding was done irregularly but was attended to at least three or four times a day.

The grasshoppers were often taken directly by the little merganser the moment they dropped to the ground in the pen from the writer's hands, especially when the victim moved. If it remained quiet, it was often overlooked. When the bird was about a week old it would dart after an escaping grasshopper with great speed and skill.

The operation of swallowing a grasshopper usually involved many manipulations. (See Plate XXIII, fig. 2.) Rapid movements of the mandibles and of the whole head for that matter, were involved, and it seemed to be often quite an undertaking. Even when the head-end was taken first, projecting wings or legs caused a lot of trouble. On July 25, thirty grasshoppers of the size mentioned were eaten by this bird.

The hen was given food for her own consumption in the form of grain, and table scraps. These were offered to the merganser persistently by the hen but they were not accepted at first. During

[1] Robinson, H. W. British Birds. Vol. II, p. 31.

the third week, some of these table scraps were observed to be eaten by the merganser, especially bits of cooked fish. Cooked fish proved to be the most satisfactory food as it could be kept in an ice box for several days without spoiling and the merganser seemed to thrive on it.

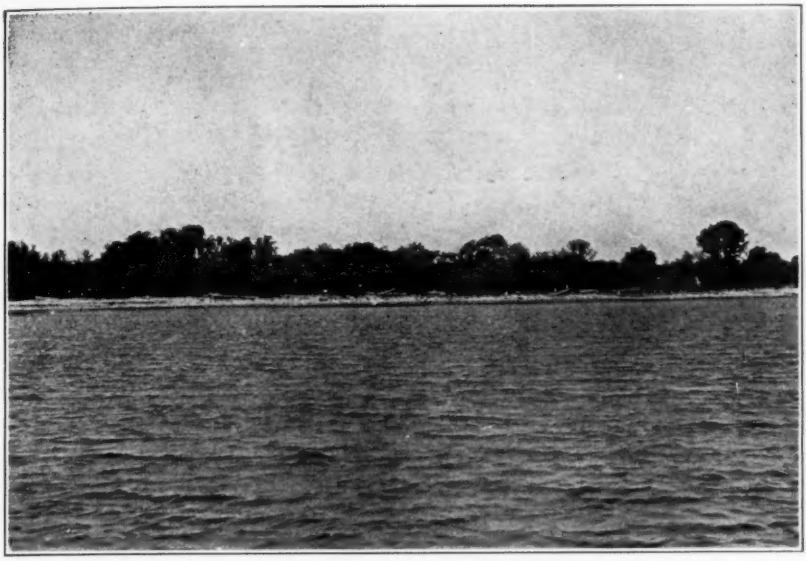
Audubon [1] states that the young of the Red-breasted Merganser go to the water a few hours after hatching and are expert at diving from the first. This is to be expected, of course, as ducklings take to the water at once, though ducks are no more aquatic in their habits than mergansers, and are excelled in diving ability by the latter. The following is taken from Chamberlain's [2] description: "Soon after they are hatched, the young are led to the water, and at an early age they swim rapidly and dive with great expertness, as I have learned by experience."

Clear spring water was kept for the hen and mergansers in a rectangular pan about two to three inches deep. The little birds were never observed to swim. The three mergansers which appear in the illustrations were all placed in the water, but they jumped out as though frightened. The single bird which lived more than a few days was seen in the pan only twice during the first nine days. On one occasion, it seemed to be enjoying the water though not swimming. On the tenth day the writer's notes contained the following: "Saw merganser in water today when it thrust its bill under water a couple of times. It left the water within a minute after my arrival but I could not tell whether it would have remained in longer if I had not been present." It is a curious fact that the mergansers which died were found lying in the water pan.

The surviving merganser was often seen on the hen's back, and it appeared fully as devoted to her as a chick could be. When separated, the little bird would appear much disturbed, and peeps somewhat resembling those made by a duckling under similar circumstances were made. This devotion is suggested in Plate XXII, fig. 2. On the other hand, one of the nestlings escaped from the box where it was hatched, on the second day. It went

[1] Audubon, J. J. Ornithological Biography.

[2] Chamberlain, M. A Popular Handbook of Birds. The Ornithology of the United States. Based on Nuttall's Manual. Vol. 2, pp. 360–362.



1. CHARACTERISTIC BREEDING HABITAT OF RED-BREASTED MERGANSER.

2. RED-BREASTED MERGANSER, FOUR WEEKS OLD, WITH FOSTER MOTHER.

through a barn door and out into the yard where it was found by the writer, about ten rods away lying peacefully on the ground among some chickens.

On August 3, the merganser and hen were placed in a box and taken to Chicago where they arrived safely after a journey of about thirty hours. They were kept in a backyard in Chicago for about ten days. During this time, the view shown in Plate XXII, fig. 2, was taken. The bird was then fat and apparently healthy. When about one month old it was taken to the Lincoln Park Zoological Gardens. The keeper noticed the hen stepping on the merganser and separated them. A day or so later the young bird died and thus ended the hope that a zoological garden might have a live merganser.

As is the case with young ducks, there appears to be little change in the plumage during the first month. In Plate XXII, fig. 2, the merganser is seen to be still in the down plumage. The tail is provided with a set of bristly feathers which have a shaft or rhachis and are in evidence even at hatching.

According to Dawson and Bowles [1] the young birds are nearly full grown before they can fly, but they can flutter over the water very effectively, almost walking on it.

Besides being an expert diver, the Red-breasted Merganser is described by Morris,[2] Samuels,[3] and Dawson and Bowles as sometimes swimming with the body submerged as the grebes do with bill and upper part of the body only above water.

Various writers including Dunn,[4] Morris,[5] and Gould [6] state that the male Red-breasted Merganser undergoes a molt after the female begins incubation. This molt has been described by Stone [7] for a specimen which was collected in July. The occurrence of a molt at this time would seem to support the view mentioned in this article that the male deserts the female after the eggs are laid and takes no part in the care of the eggs or young.

[1] Dawson and Bowles. The Birds of Washington. Vol. II.
[2] Morris, F. O. A History of British Birds.
[3] Samuels, E. A. Our Northern and Eastern Birds. 1883. p. 526.
[4] Quoted in Yarrell's "A History of British Birds."
[5] Morris, F. O. A History of British Birds.
[6] Gould, J. The Birds of Great Britain. Vol. V.
[7] Stone, W. The Summer Molting Plumage of Certain Ducks. Proc. Acad. Nat. Sc. Philadelphia. 1899. pp. 471–472.

Audubon [1] states that the males are not fully developed until the second year.

The voice of the adult bird is described by Morris [2] as consisting of a note "*curr, curr.*" The following is taken from Nelson's [3] account "The old bird marshalled her brood to the farther side of the pond as I drew near, uttering frequently a low, distinct, but husky, *kha-kha.*" The writer has already noted on p. 4 of this article a resemblance in the voice to that of the domestic duck.

A pair of adult Red-breasted Mergansers with five downy young are figured, natural-size, in one large colored plate by Gould.[4] The colors are fair, but the positions and the grouping are artificial.

The Red-breasted Merganser usually appears in the region of Chicago in March or early April, though it is reported as sometimes spending the winter in the vicinity. Flocks occur in the lagoons of Jackson Park until early May, and individuals sometimes linger through a large portion of May. It seems probable that nesting does not begin until early June.

---

[1] Audubon, J. J. Ornithological Biography.

[2] Morris, F. O. A History of British Birds.

[3] Nelson, E. W. Report upon Natural History Collections Made in Alaska between the Years 1877 and 1881. No. III. Arctic Series. U. S. Army Signal Service. p. 67.

[4] Gould, J. The Birds of Great Britain. Vol. V.

REMARKS ON THE CASE OF ROOSEVELT *VS.* THAYER, WITH A FEW INDEPENDENT SUGGESTIONS ON THE CONCEALING COLORATION QUESTION.

BY FRANCIS H. ALLEN.

COLONEL ROOSEVELT in his recent paper on 'Revealing and Concealing Coloration in Birds and Mammals' [1] makes an attack on the work of Messrs. Abbott H. and Gerald H. Thayer and sounds the slogan of 'common sense' as against the Messrs. Thayer's 'wild absurdities,' as he is pleased to term some of the views set forth in their book. Other persons have spoken approvingly of the sound 'common sense' of Roosevelt's paper. Now common sense is an excellent thing; I might go farther and call it indispensable; and yet, with the greatest respect for it, we must admit that it has its limitations. In Columbus's day common sense declared that the world was flat. More recently it carefully protected the consumptive from 'night air.' And, if I mistake not, it is still an obstacle to the spread of scientific education. It is hardly safe, I think, to trust to common sense alone to settle the question of concealing coloration or any other scientific question. It is science that must settle it, though she must call on both common sense and imagination to help her,— imagination as well as common sense, for one without the other would be only a hindrance. Any science that goes deeper or soars higher than the mere accumulation of facts must make use of the imagination.[2] This is a truism, of course, but it seems necessary to insist upon it a little under the circumstances.

And we must also face the fact that it is not always the best, *i. e.* the most accurate and diligent, observer that makes discover-

---

[1] Bulletin of the American Museum of Natural History, Vol. XXX, Art. VIII, pp. 119–231, New York, August 23, 1911.

[2] "My success as a man of science, whatever this may have amounted to, has been determined as far as I can judge, by complex and diversified mental qualities and conditions. Of these, the most important have been — the love of science — unbounded patience in long reflecting over any subject — industry in observing and collecting facts — and *a fair share of invention as well as of common sense.*" — Charles Darwin. (The italics are the quoter's.)

ies. It is the thinker rather, never the *mere* observer. It must be admitted, I think, that light on scientific problems sometimes comes from the outside, that is from outside the group of workers who fancy themselves the only ones who know anything about their specialty. Of course we welcome the light no matter what its source, even though it may come from one who has given most of his life to art rather than to science, even though that artist may have adopted a far from deferential tone towards the naturalists whom he is trying to convince.

I cannot help thinking that Mr. Thayer (to save trouble I shall speak of him in the singular number) has prejudiced his case among ornithologists not a little by the manner in which he has presented it. Even more prejudicial than the rather arrogant attitude he seems to take in regard to the relative claims of the artist and the biologist to be entitled to form an opinion on the subject of coloration,— even more prejudicial, if less irritating, is the — shall I call it cocksure? — way in which mere conjectures are stated as facts. His book would have gained much in weight, I think, if a proper distinction had been made between those propositions which were in some sort susceptible of proof and those that should have been put forth only as suggestions. Nevertheless, though the book is far from being a safe guide for the uninstructed, it ought to be possible for scientific men to read it in an unprejudiced spirit, making all proper allowances for the 'artistic temperament' that shaped its form. It is a regrettable fact, however, that some reviewers have *seemed* to be more intent upon bringing Mr. Thayer into ridicule than on arriving at the real facts in the case of concealing coloration. 'Seemed' I say, for, though perhaps I do them an injustice, that is the impression a reader is bound to carry away with him. Ridicule is a powerful weapon and the temptation to use it unsparingly is a strong one. But I want to ask fair treatment for Mr. Thayer. Even if we don't agree with him, it is not necessary either to cut him into little pieces or to break every bone in his body with the 'big stick.'

If we adopt a fair attitude towards Mr. Thayer and his book, we must begin by admitting that by virtue of his profession he *is* an expert in all matters pertaining to color. A scientific man may know all the artist knows about the laws of light and color,

but no man of science who is not also a painter has the habit of mind that keeps him constantly on the watch for effects of color, pattern, and light and shade. How many ornithologists are in the same class with Mr. Thayer? Mr. Fuertes, perhaps, who agrees with Thayer in the main, but certainly not Dr. Barbour, nor Dr. Phillips, nor Colonel Roosevelt. Mr. Thayer of course cannot as an artist claim exclusive right to weigh the facts and render judgment. That is the office of the scientific men. But he has a right to testify to the facts and to be accorded a respectful hearing. Scientific men will not reject the artist's testimony because he may have the 'artistic temperament,' though it is proper to take that into consideration in determining the admissibility of the evidence. I venture to express the opinion that Mr. Thayer knows more about the coloration of animals in its relation to the concealment of those animals than any other man in this country. Perhaps he knows a few things that 'ain't so,'— personally I think that some of his knowledge does belong to that category,— but it will not do to deny him the credit of a really vast knowledge of this subject. His opinions, therefore, are entitled to respect, much more respect than they have received at the hands of some of his critics.

Mr. Thayer was the first to call attention to the function of counter-shading in the concealment of animals. I think most naturalists admit its importance. We owe Mr. Thayer a debt of gratitude for pointing out this interesting fact. It was because he was an artist that he discovered it,— because he had formed the habit of seeing things as they *looked* rather than as he knew or suspected them to be. Scientific men had been at work on the problems of coloration for many years without discovering this thing that now seems so obvious. We see it now, and we admit it. Perhaps some others of Thayer's discoveries — to use his own word — are less obvious, but that does not make them necessarily any the less truly discoveries. We ought to hesitate to reject them without considering very carefully whether in these other cases the expert in colors and appearances may not be in the right. And again I respectfully suggest that common sense cannot settle the question. Common sense has made up its mind. Open-minded science must settle scientific problems.

Having tried to show why Mr. Thayer should be accorded a considerate hearing, I will now attempt to show why Colonel Roosevelt, with all his wide field experience, is not a safe guide to follow implicitly. I adopt this method of approach because I fear that Roosevelt's paper, following that of Barbour and Phillips, has had a reactionary influence out of proportion to its importance, and I am led to believe that it has not been examined very critically.

I have detected in Roosevelt's paper and the reply to Thayer's criticisms appended thereto upwards of fifty instances of misquotations, misrepresentations, and perversions of Thayer's statements and pieces of faulty reasoning in matters of detail, while the paper is full of dogmatic utterances which must be just as offensive to fair-minded readers as any of Thayer's unguarded overstatements — and more so. A few specimens will be sufficient, I think, to show Roosevelt's inaccurate habit of mind and slapdash style of thinking. In two places (in the footnote on page 156 and on page 220) he instances the photographs of certain birds taken by Messrs. Job, Finley, and Chapman as showing the conspicuousness of those species in a state of nature, quite overlooking the obvious facts that the photographers naturally chose the conspicuous subjects, avoiding those that were at all obscured and getting their cameras into positions where the birds would come out most clearly, and thus made the birds as conspicuous as they possibly could, which was the end and aim of their work. I take it that the birds in most photographs do not appear at all as they would under average conditions in their natural surroundings. Then, on page 162 we are told that the Scissor-tailed Flycatcher is conspicuous in *shape*, but we are not informed how a bird can be conspicuous in shape. I suppose if a row of Kingbirds were pinned against a white screen and a Scissor-tailed Flycatcher were placed in the middle of the row, the latter bird would be made conspicuous by its shape, but how could it be so in its natural surroundings? It is evident that by 'conspicuous' Roosevelt here means unusual, remarkable, but the words are by no means synonymous. I shall have something to say later on this confusion of ideas that tends to call an unusual or brightly colored object conspicuous. As to the Scissor-tail, Roosevelt goes on to say that it is conspicuous

"in color and in habits, has no concealing coloration, and never conceals itself," and that "its long tail merely adds to its already great conspicuousness." Though this is stated as a fact, no evidence is given in support, and we must regard the statement merely as the expression of an opinion,— an opinion which, in view of its author's confusion of mind as to what constitutes conspicuousness, may be taken for what it is worth. One of the most astonishing of Roosevelt's blunders is his failure to see that white cannot possibly show light against a clear moonless night sky. On page 176 he says that "even against the sky line" the white rump of the prongbuck is "always advertising at night"; and on page 179 he says that "at night white is not normally a sky color, ... so that these white stern marks are *not* 'sky pattern marks' at the very time when, according to his [Thayer's] theory, they serve as such." Now the night sky, if not what we should call white in the daylight, is yet the lightest thing to be seen on a moonless night, and the deer's tail or the antelope's rump, not being luminous in itself, cannot possibly be any lighter than the sky which is the source of light.[1] White is white, of course, only by virtue of its reflecting all the light that strikes it. It needs only a little knowledge of the significance of colors and a little 'common sense' to see that, but it is easy enough to prove it by experiment too. And Roosevelt's failure to appreciate it is the more astonishing when we are informed that he has experimented with a white towel, only to find that his own views are completely vindicated! In this one point, it seems to me, Roosevelt has shown so complete an ignorance of the most elementary laws of color as to go far towards unfitting him for any discussion of the subject of animal coloration, while showing besides an inability to profit from observation which must vitiate to a great extent the value of the observations which his wide field experience has enabled him to make.

I have before spoken of Roosevelt's dogmatism. Akin to that is his propensity for loose statements such as that on page 184, where he says that the two forms of the red fox, the typical red and the cross fox, are "equally successful in life." If equally successful, why is not the cross fox as common as the red? Since

[1] A little observation will convince most persons that the light on such a night comes from the sky as a whole rather than from the individual stars and planets.

it is not so common, how can he prove it is as successful? He speaks so frequently of one animal being as successful in life as another that one comes to believe that he thinks all animals are equally successful in life!

On page 202, Roosevelt says that Thayer "states that a crouching hare is 'boldly conspicuous' when seen from the position of any 'quadruped pursuer' that would have to look upwards at the hare's tail," and then he goes on to ridicule Thayer and talk about 'preposterous theories' and 'wild absurdities' and use other language which might be appropriate (though impolite) *if Thayer had said anything of the kind.* In reality, however, Roosevelt has made a flagrant misquotation. What Thayer actually said was that the crouching hare was "boldly conspicuous when seen from the position of a mouse or cricket." [1] Now I do not suppose that Roosevelt would really call a mouse, or even a cricket, a 'quadruped pursuer' of the hare! It is obvious that his eagerness to punch Mr. Thayer has led him into a grossly careless misreading of him.

Another ill-considered statement occurs on page 218, where he says, "Birds and mammals living under precisely the same conditions have totally different types of coloration, and display totally different traits and habits when seeking to escape from enemies or to capture prey." Of course, a very little reflection would have shown him that no two species ever live under precisely the same conditions. The very fact of their having different habits in seeking to escape enemies or to capture prey constitutes a difference in the conditions of their lives.

But the most serious of all the misreadings of Thayer that we find in Roosevelt's paper has to do with counter-shading. He entirely overlooks the fact that Thayer's claims for the efficacy of counter-shading concern only those natural backgrounds which the animal resembles in *color*, or, to quote from page 15 of Thayer's book, it is "when seen against a background of color and pattern like its own" that the counter-shaded animal "will be essentially indistinguishable at a short distance." Overlooking this, Roosevelt says, on page 136, "Mr. Thayer insists that the animal escapes observation, not because its colors match its surroundings, or

[1] *Concealing-Coloration in the Animal Kingdom*, motto to Fig. 103, opp. p. 150.

because it sits motionless like a stump, or clod, or some such inanimate thing, but purely because of its shading, which he says is rendered obliterative by the counter-gradation of shades." Then, after adducing considerable evidence as to brown rabbits on green lawns, etc., he says (of woodchucks and pikas) that he never found any difficulty in seeing either when he "could get it on an entirely smooth surface of rock or ground, unless the color of the surface happened to agree absolutely with the color of the coat." Of course not; no one could be expected to, and Mr. Thayer would be the last man to suggest it. Again, on page 189, he tilts at the same windmill. In fact, much of his elaborate argument against counter-shading falls to the ground when we see that it is founded on a misconception.

This matter of color-gradation Roosevelt completely fails to grasp, and his apparent stupidity about it is really amazing. On page 137 he considers it a point against the efficacy of counter-shading that it does not show in a rabbit sitting stern on and that nevertheless the rabbit is no easier to make out in that position than if sideways to the observer. Now of course counter-shading is of avail only where a shadow is cast and in all other positions it is not needed. He falls into the same blunder on page 158 where he says that the female Bob-white on her nest is concealingly colored in spite of not being counter-shaded in that position. Similarly in another place he adduces the absence of counter-shading on the body of a swimming duck; and in his Appendix on protective coloration in *African Game Trails* he remarks on the difficulty that some animal or animals had in making him out as he stood in the forest, even though he was not counter-shaded; though it is hard to see how a man standing upright, or any other upright object with practically no under side except what rested actually on the ground, could possibly be counter-shaded. Does he imagine he might have been still more invisible if he had worn white trousers?

But I think I have said enough to show that Colonel Roosevelt's methods of thought are such that we cannot place implicit confidence in the accuracy of his observation or the soundness of his judgments. If Thayer has been carried away by his enthusiasm, Roosevelt has been carried just as far in the opposite direction

by his prejudices. It is evident, I think, that we cannot accept Roosevelt's conclusions without careful examination, and equally evident that Thayer's testimony, expert though it is, must be weighed in the judicial balance before we can know how much it is worth. And it is for scientific men to make the examination and do the weighing, not for artists nor for hunters. I do not, of course, propose to attempt to settle the question myself. I am simply going to try to draw the lines a little more clearly,— to whistle up a breeze that shall blow away some of the dust and smoke that have settled down over the field, so that the issue may be seen more distinctly.

In the first place, then, what is Mr. Thayer's main contention? It is stated in the Introduction to his book as follows: "The colors, patterns, and appendages of animals are the most perfect imaginable effacers under the very circumstances wherein such effacement would most serve the wearer. For any animal to be seen looking conspicuous means no more than that he is not at those moments looked at under the circumstances for which his concealing-colors are effective."[1] Obviously it is impossible to prove this general statement in particular. No one knows enough of the conditions of the lives of all animals to do so. I think Mr. Thayer is justified, however, in his contention that *if* his conclusions are found to be reasonable in an overwhelming number of cases, it is only fair to give him the benefit of the doubt in those remaining cases where proof is more difficult or even impossible with our present knowledge. Of course, if it can be proved that these hypothetical exceptional cases are *not* cases of concealing coloration, that will settle the question so far as the existence of a universal law is concerned; but it is notoriously hard to prove a negative. I mean by this that Thayer is not called upon to explain the coloration of every single species of bird or mammal. *If* we find his theory true in the main, we can accept the doubtful cases on faith. That is what we have done with the evolutionary theory. It is not necessary to account for the development of every species by natural selection or any other means. We believe in the theory in spite of the inexplicable cases. It must be admitted, however,

[1] *Op. cit.*, p. 9.

that the theory of evolution stands on a somewhat different footing from that of concealing coloration, in that it is in its very nature a universal one, while to account for coloration there may be several theories which are not mutually exclusive. In fact, there seems to be no good *a-priori* reason for *seeking* a universal law for coloration. The old theories, of protective coloration, sexual selection, mimicry, warning colors, directive markings, etc., have long been considered satisfactory enough. If, however, there actually is such a universal law as Thayer asserts, we must come to accept it in the end. It remains to learn the facts.

I need not go into the various methods by which, according to Mr. Thayer, concealment is brought about,— counter-shading, background-picturing, ruptive and secant patterns, masking of eyes, bills and feet, iridescence, appendages, etc. It may be taken for granted that my readers are familiar with the main principles as enunciated by him. Let us turn at once to Colonel Roosevelt's conclusions and see just wherein they differ from Thayer's. In the first place, then, he refuses to accept the theory of natural selection as accounting for such concealing coloration as he admits to exist. He says it is *possible* that the tendency towards concealing coloration is the result of natural selection, but to his mind much more probable that the major part of the tendency is due to the effect of physical surroundings upon all the individuals of a species.[1] This theory has, of course, been held by many, but though moisture and dryness, heat and cold, and diet, all doubtless do have an effect in certain cases, as Mr. Beebe has proved, for instance, in his experiments with birds in captivity, it is in the main a vague and unsatisfactory theory, since it cannot show the method by which such changes are brought about. To most of us, I think, the theory of natural selection seems the most reasonable explanation of most of the facts of evolution. Whether or not Roosevelt's doubts about it are due to a difficulty in reconciling his ideas of advertising coloration with it, he does not state, and we can only conjecture.

Here, then, is one distinct issue,— a belief in natural selection, which, of course, Thayer believes to be universal and Roosevelt

[1] *Revealing and Concealing Coloration in Birds and Mammals*, p. 212 (1).

refuses to accept. Another, but less important, issue is the cognate one of sexual selection, which Roosevelt accepts, though guardedly, but Thayer rejects (implicitly if not explicitly) on the ground that it implies conspicuous coloration, whereas he holds that truly conspicuous coloration does not exist. We will revert to this subject later on.

The next important conclusion of Colonel Roosevelt is that "as regards the majority of birds and mammals the prime factors in securing their safety, are habit (including bodily capacity) if they do not trust to concealment, and habit and cover if they do trust to concealment."[1] "Among these birds and mammals," he says, "the coloration is always a minor, and often a negligible, factor." Now no one doubts the importance of habit, bodily capacity, and cover in protecting animals, but to me it seems an impossibility to settle just what factor is most important. As a matter of fact they are all interwoven, habit depending on coloration, capacity, and cover, coloration depending on cover and habit, etc., etc., so that it seems futile to think of one without the others. To discuss their relative importance would remind one of the discussions in the old-time debating societies, and one might as well argue the question whether the blood or the brain was the more necessary to the life and welfare of man. Of course, when it comes to stating, as Roosevelt does here, that coloration is often a *negligible* factor, that is properly a matter for observation and argument, and that is one of the points upon which Roosevelt's observations and arguments must be weighed.

Roosevelt's next important conclusion — and this, in fact, is the sum and substance of his whole paper so far as it concerns our birds — is that "a large majority, probably at least three fourths or over, of the birds of temperate North America, have coloration patterns which, either in whole or in part, either all the time in both sexes, or all the time in one sex, or some of the time in one sex, are advertising."[1] In support of this conclusion he brings an argument which may prove to be a strong one and well founded. At least it has a certain plausibility and will bear investigation. This is the suggestion that the miscellaneous character

[1] *Op. cit.*, p. 214 (5).

of forest cover is such as to make the detection of an animal of *any* color difficult so long as it remains motionless. (It will be observed that Roosevelt in this gives up the claim that animals under such conditions are actually conspicuous. He admits that they are not, but holds that their coloration has no significance under such circumstances and that therefore it could not have been brought about through natural selection.) One obvious answer is a statement of the well-known fact that the birds of the treetops run quite largely to the brilliant colors, while sea-birds, for instance, show an entirely different style of coloration, largely white and gray and black. As before stated, it is difficult to account satisfactorily for such differences without involving the theory of natural selection. Certainly sexual selection will not explain them, and without one or the other of these methods of selection we should have to fall back upon the vague and unsatisfactory theories of 'harmony in nature' which, if they have any definiteness at all, are really more metaphysical than scientific. But wholly aside from probabilities and theory, what are the facts in the case? Is it true that a bird of any color would be inconspicuous in the forest and that no coloration scheme can make any difference in its conspicuousness? It seems to me that the obvious way to settle this question is by experiment; observation under purely natural conditions being unavailable in this case. Distribute a number of bird-skins, forest birds and sea-birds, impartially in the treetops in some thick wood and see whether there actually is any difference in their conspicuousness or not. It ought not to be a difficult experiment. I am not aware that Mr. Thayer has ever tried it in any of his demonstrations. I hope he will, and I hope that others will.

This suggestion of Roosevelt's,— or rather this pronouncement, for of course he does not offer it as a mere suggestion, though we can accept it as such,— this suggestion that all colors, bright or dull, may be inconspicuous in a forest landscape is to my mind the most important point he makes. Except for this one point, indeed, it seems to me that the value of his paper depends almost entirely on whether we can accept his interpretation of his own

[1] *Op. cit.*, p. 214 (6).

observations. He states, without qualification, that such and such an animal is advertisingly colored. Well, perhaps it is, but the mere statement does not prove it. I have tried to show in an earlier part of this paper why we should be slow to accept all his statements without question, while giving him credit for wide experience and honesty of intention. Let us consider his methods of study as compared with Thayer's, and determine, if we can, which are the more trustworthy. Roosevelt's methods are those of pure observation in the field, with the animals under natural conditions: Thayer uses experiment in addition to observation. Now I should be the last man to depreciate observation. It is the particular form of scientific work that most appeals to my personal tastes. Laboratory methods in the study of living animals have their uses, however, and are more and more being used. By these methods only can we control conditions, so as to isolate the particular class of facts that we are investigating. Rightly safeguarded, this mode of research is invaluable. And it seems to me that in investigating concealing coloration we cannot get along without it, for the simple reason that it is impossible to *observe* anything that is concealed from the eye. When an animal is showing to the best advantage the concealing power of its coloration, that is the very time when we do not see it. I suppose, therefore, that the times when the observer can see this principle in operation in the field are so infrequent, comparatively speaking, that one may get a wholly wrong impression as to the relative conspicuousness of an animal from mere observation and memory. The number of times when a bird, for instance, just fails to elude us ought to be multiplied by a substantial figure in order to include all those individuals which actually do elude us. Of course, no bird of any color can blend into its background all the time. All birds of potentially concealing coloration must sometimes, often in fact, be seen against backgrounds that reveal them. And it is on just these occasions that the observer is most likely to see them. Moreover, the birds that *are* seen against a background that they match, detected by following their flight perhaps, hold the eye as long as the observer watches them and so tend to be regarded as conspicuous. In other words, as Thayer has pointed out, it is the animals that are seen that make their

impression upon us, not the perhaps larger number of individuals of the same species that come within sight of us when we are in their haunts but of which we have no knowledge. Experiments like Thayer's, conducted privately or in conjunction with other persons, are, it seems to me, the most profitable mode of study of the concealing power of coloration, for only by some such means can these inherent difficulties be avoided.

I am aware that there is some distrust of Mr. Thayer's methods of experiment and demonstration, on the ground that in some cases he has not reproduced accurately the natural surroundings of the animals experimented with. It seems to me that such failure to duplicate natural conditions need not be counted against the method itself. Of course, experiments are of little value if we do not know just what the environment of an animal is, but if we do know it and can reproduce it approximately in our home landscape, the method is a perfectly legitimate one. The fact that Mr. Thayer may have been mistaken in regard to the habitat of the Peacock does not vitiate all his experiments, but he and any one else who conducts experiments along this line must, of course, take pains to copy natural conditions faithfully. And we must not leave all the experimenting to Mr. Thayer.

There are other tendencies of the human mind that must be guarded against in prosecuting our studies. One of these I suspect ornithologists are especially subject to. That is the tendency to see what we *know* is there rather than what actually appears to the eye. We are probably more subject to it than most persons because we deal so constantly with what I may call *absolute* color, — color that is such by virtue of pigmentation and structure, not color as seen out of doors in varying lights and subject to the influence of countless neighboring colors. We see a bird's under parts as white, sometimes doubtless because we *know* they are white, and sometimes by the eye's unconsciously making allowance for the effect of shade. In the case of an unrecognized bird observed in the field, we take the greatest pains to get it in the best possible light, and we are constantly translating its apparent colors into terms of the absolute colors that we know or suspect them to represent. That is the only way that we can identify an unfamiliar bird,— without having it in the hand, where no

such translation is necessary. But that is not the way to pursue studies in concealing coloration. We must cultivate the artist's power of seeing only what appears on the surface, if we would see things as the wild creatures see them.

Another tendency that must be guarded against is that of confusing brightness of color with conspicuousness. It is natural, of course, to suppose that a brightly colored bird would be conspicuous, but brightness is by no means synonymous with conspicuousness. There is danger of regarding a bird as conspicuous simply because its colors are unusual and pleasing to the human eye. The real question is whether the bird itself is particularly easily seen in the landscape, and recognized as a bird, by a creature which is merely looking for *any* bird to eat and is not concerned either to wonder at and admire its beauty or to identify it as belonging to a particular species. Of this confusion between unusualness and conspicuousness I have already noted a flagrant case in connection with the Scissor-tailed Flycatcher, whose tail Roosevelt called conspicuous *in shape*. Another very common instance is that of the Blue Jay in a snowy landscape. This bird never looks more beautiful, I think, than against a background of snow, which sets off his blue plumage to perfection. Deceived by his beauty, we are prone to call him a very conspicuous bird, but careful observation will convince any one that he is really not a bit more conspicuous on an even expanse of unshaded or wholly shaded snow than any other dark-colored bird of about the same size, a Robin for instance, while, seen among tree-shadows on the snow, he is actually inconspicuous, as I have noticed on several occasions. The blue of his plumage when lighted by the sun matches the blue of the shadows almost exactly. This is one of the points upon which Mr. Thayer has been most sharply attacked, but any one can prove to himself the relative inconspicuousness of the Blue Jay against snow in the woods if he will try a few experiments and do a little real observation. Take notice, however, that I am merely stating a fact, not drawing any inferences. Whether the fact that the Blue Jay is concealingly colored for winter in a wooded region where snow abounds has any particular significance — whether the coloring has any real protective function other than a purely incidental one — is another matter entirely, and one which I shall not go into at present.

Another element of confusion comes in when we consider recognition-marks or identification-marks. Mr. John T. Nichols has not avoided this confusion of ideas in his discussion of certain recognition-marks in the January 'Auk'. The white stripe down the wing of the Spotted Sandpiper in flight is an excellent field-mark for identification purposes, but I very much doubt if the bird is rendered one whit more conspicuous by it, as a mere bird. Identification-marks have no necessary connection with conspicuousness. In fact, any distinctive marking on a bird may serve as an identification-mark to the ornithologist, and it doubtless may also serve as a recognition-mark for other individuals of the species. The particular class of markings which have come to be called recognition-marks are those which, in the case of birds, are shown prominently in flight, generally on the wings, tail, or rump. They doubtless serve as a means of identifying birds to others of the same species when seen at some distance, the more striking markings operating at the greater distances. But this, though Thayer himself does not appear to have perceived it, does not militate in the slightest against his idea that white markings on wings, rumps, and tails are really concealing rather than revealing in their effect. When I advanced this opinion in conversation with a good friend of mine, he accused me of holding that a bird could be at the same time revealingly colored to its friends and concealingly colored to its enemies. This is not at all what I am saying, however. My point is that these markings are not revealing to either friend or enemy; that is, they do not reveal the bird, they simply identify the species. This, it will be seen, is of little or no importance to the enemy, which is not concerned to know whether the prey it is pursuing belongs to this or that species, but it is of very vital importance to the species that individuals should easily find one another and keep together.

Here, then, are four special tendencies to error to be guarded against in the study of concealing coloration: the tendency to regard any animal actually seen as conspicuous and to take no account of those individuals which escape observation, the tendency to see things as we know or suspect them to be rather than as they really look to us, the tendency to confuse brightness of color with conspicuousness, and the tendency to regard recognition-

marks as of necessity advertising in function. Mr. Thayer, himself, as I have pointed out, in rejecting the theory of recognition-marks fails to see that it is by no means incompatible with his own ideas. There are other cases where it seems to me that his views and those of his opponents are not irreconcilable. One of these is that of a particular class of recognition-marks which under certain conditions are probably advertising and which, indeed, seem to owe their usefulness as recognition-marks to their revealing power. These are the so-called banner-marks of deer, antelopes, rabbits, etc.

Thayer's treatment of these white stern-patches I have thought to be the weakest link in his chain of evidence and argument. His claim that the deer's white flag, for instance, is actually a concealing mark is one of the hardest for us to admit of all the claims he has made. The banner-mark theory, for one thing, was such a neat and satisfactory one and seemed so thoroughly to 'fill the bill' that we dislike to give it up. Any fair-minded and unprejudiced person, however, who will take the trouble to try experiments, or who can see the logic of the situation, must admit that, seen against the sky, in the long run the white must prove to be concealing rather than revealing. The difficulty lies in convincing ourselves that the flag would actually be seen against the sky most of the time rather than against foliage or a hillside. I must confess that I have not yet tried enough experiments to assure myself on this point. What little I have done goes to indicate that Thayer may be right. My idea would be to take from time to time in the woods the point of view of panther or wolf and see whether the interstices in the foliage at the height of a deer's tail at varying distances were numerous enough to spot the landscape pretty thoroughly with glimpses of the sky. It must be borne in mind that it is not necessary to concealment that the white flag should actually relieve against the sky; if it appears among a number of scattered sky spots so that it does not attract attention to itself to the exclusion of other things in the neighborhood, that is quite sufficient. I recommend that this experiment be tried before we indulge in any more ridicule of Mr. Thayer's lack of 'common sense' in this matter.

But if our experiments prove that Thayer is right as to the con-

cealing properties of the deer's white flag, it may still be that this concealment is only incidental, for I suspect that in the deer's case, as in the case of the Spotted Sandpipers before referred to, the white markings may still serve the purpose of directing the deer's companions. The deer's head is carried above the level of his tail or perhaps on a level with the uplifted tail, so that normally the flag would appear to another deer against a very different background from that which the panther or wolf would see it against; that is, of course, when the deer in front is not bounding high in the air, but the flag is thrown up first while the deer is still on the ground and may even be carried that way at a slow canter, and then, too, the following deer is also bounding and so could often catch the white gleam from the deer in front as its tail relieved against the foliage or the ground. I merely throw this out as a suggestion of a possible reconciliation of the theory of directive markings with that of the inherent concealing power of all markings. There is much to be learned about these things, and common sense *plus* experiment and thought will be a safer tutor than unaided common sense. I will add that the last time I saw the deer throw up their white flags, the white, being seen against an evenly clouded sky, was inconspicuous. Of course, it was visible, because this was in the daylight and the deer were in plain sight, but it detracted from, rather than added to, the conspicuousness of the deer.

Sexual selection is another theory that seems to me not at all incompatible with Thayer's main contention. Bright colors, as he shows, or endeavors to show, are not necessarily revealing, but that is not saying that they may not be attractive to the opposite sex. It seems to me that many of the bright and beautiful colors and markings in the plumage of birds may be produced by sexual selection but afterwards acted upon by natural selection. Sexual selection, that is, may supply a short cut to the production of concealing colors when they happen to be bright ones; or, to put it in another way, natural selection may set bounds (I borrow the expression from Roosevelt) to the colorations produced by sexual selection. It seems to me that Mr. Thayer is unnecessarily shy of sexual selection. I cannot see that it tells against his theories at all, and it is a reasonable explanation of the primary, or perhaps I should say the secondary, cause of many forms of coloration.

In the case of those species which make evident displays of brightly colored parts, it is particularly indicated. But colors and markings that are so made use of in the close quarters of courtship are not necessarily conspicuous to enemies or prey at a distance or which if in close proximity are not already aware of the presence of their wearers.

But I shall go no farther at present into this subject of concealing coloration. This paper is not intended as a complete review of Mr. Thayer's book nor even of Colonel Roosevelt's paper. I simply have not been contented to let things stand as Barbour, Phillips, and Roosevelt have left them, because I believe that, in their anxiety lest Thayer's 'heresies' should be too widely accepted, they have failed to do justice to his work. I think it must be admitted, even by those of us who are most appreciative of Mr. Thayer's work, that he has not yet *proved* his main contention. That is, he has not convinced us beyond a reasonable doubt that all coloration of animals has a concealing function and owes its existence to natural selection. I will not say that this is insusceptible of proof, but other ways of accounting for certain colorations seem fairly satisfactory as yet. Nevertheless, Mr. Thayer has shown us several things that we had not seen before, most important of which, doubtless, is the use of counter-shading, though hardly less so is the possibility of bright colors as well as neutral tints being actually concealing in effect. I think that no one can read his book carefully and study his pictures or witness his experiments and demonstrations, no one can experiment for himself out of doors in a leafy and sunlit landscape, without becoming convinced that nature is full of brilliant colors that can be matched only by correspondingly bright hues in the birds. Mr. Thayer's book comes very near being a work of genius, and I submit that scientific men can ill afford to treat it lightly.

When the foregoing paper was read (in a somewhat different form) at a meeting of the Nuttall Ornithological Club, March 18, 1912, one of the members, a leading ornithologist and a Fellow of the A. O. U., stated that he doubted the necessity of protective coloration; that he considered the wariness and intelligence of

animals the only necessary factor in their preservation. My answer to that was that it seemed to me there must be some significance in the fact that there existed in so many undisputed cases so evident a concealing power in coloration. Would this concealment exist if it conferred no benefit upon its possessors? To me it seems only reasonable to assume that concealing coloration has a real reason for being. This is not saying, of course, that all animals are protectively colored. It may be, as is generally believed, that many animals do not need such protection, but the more one studies Mr. Thayer's discoveries in this field of concealing coloration, the more one comes to suspect its approximate universality, and the readier one is to believe that the concealment thus brought about has a protective value that is of benefit to the wearer. As to the relative value of coloration on the one hand and wariness and intelligence on the other, it seems to me, as I have already stated, that the various factors are so interdependent that it is impossible to say which is of the most use.

Another interesting objection to one of Mr. Thayer's theories was brought to light by the testimony of two members as to the unerring aim with which foxes and dogs sprang upon prey that they had located only by scent. This may militate seriously against Mr. Thayer's contention that the final spring, even in the case of animals that habitually hunt by scent, is directed by sight alone. More observation is necessary to settle this interesting point. A failure to establish Mr. Thayer's claim here would go far to weaken his position on the banner-mark question.

BIRDS OBSERVED IN MONTGOMERY COUNTY, VIRGINIA.

BY ELLISON A. SMYTH, JR.

SINCE Dr. Rives published his 'Catalogue of the Birds of the Virginias' in 1890, I know of no general list for Virginia or any county thereof. My own observations in Montgomery County were commenced in July, 1891. For the past five years, through pressure of college duties, I have been unable to get regularly into the woods during the migrations, so that, while these notes cover a period of twenty-one years, the observations upon which they are based are only comparatively close from 1891 to 1906. Dr. Rives lists 305 species as positively known within the limits of Virginia. In this one county of Montgomery I have authentic personal records of 194 species. It will be noted that in rare and unique occurrences, or where doubt might have existed as to identification, the specimen was secured and is in my collection. Exception to this occurs in one or two cases where identification was absolute and possession of the bird would have been superfluous slaughter. My observations have been made mostly within a radius of eight or ten miles of the town of Blacksburg, and many of my rarer records are from the campus of the Virginia Polytechnic Institute.

The peculiar position of Blacksburg doubtless accounts for many unexpected occurrences of eastern and western forms. The town is about 200 miles west of the Atlantic coast, and is situated in the Alleghany system, in a valley 2170 feet above sea-level. The valley, whose general trend is northeast and southwest, is largely Ordovician limestone. To the west, a low range called Brush Mountain, and to the southeast another range known as Price Mountain, are of the Lower Carboniferous. From Price Mountain, a line of hills runs to the northeast of the town, forming the natural watershed of the region; to the north of these hills the drainage is to Chesapeake Bay, and the Atlantic Ocean through Roanoke River, and to the south and west to the Gulf of Mexico, New River being a tributary of the Ohio.

Æstrelata hasitata, BLACK-CAPPED PETREL.

Taken August 30, 1893, at Blacksburg, Va. Photographed immediately after capture.

While most of the fauna is Carolinian and Alleghanian, a Canadian outcropping occurs, with a few interesting western forms, and this is also well illustrated in the insect life. Only occasionally in the winter is a temperature of zero reached, though on one occasion the record was −15°. The snow fall is comparatively light, there being less than in many nearby localities of lower altitude and farther south.

I have attempted as far as possible to note the earliest and latest occurrence of migrants. Necessarily this is incomplete and is only approximate. Some years I was able to be in the woods at least a part of nearly every day during the migrations; other years sometimes a week or more would elapse between my woodland visits, and I would have to depend on campus observations. The different kinds of ground to be covered also made it impossible to keep impartial records. In the neighborhood are rocky, steep ravines, pine-clad or with rhododendron and kalmia growth on either side; open oak woods; and in the flat broad valley pasture land, grassy or bramble-covered: thus the records of one observer must be very defective, even when extended over a long period.

Several of my records are new to Virginia; one, Franklin's Gull, was, I believe, the first record east of the Mississippi; and another, the Black-capped Petrel, was the third record for the United States. This latter is referred to in Newton's Dictionary of Birds, in a foot-note on page 709.

The large number of ducks — fifteen species — and other water birds observed, is interesting, considering the locality, and the absence of any large body of water or even stream in the immediate vicinity. The connection of New River with the Mississippi seems too remote to explain this, though it is possible that estrays from the Atlantic seaboard might follow up the Roanoke River, and from the Gulf and Mississippi, the New River; and as Blacksburg is almost on the watershed between the two, unusual visitors might thus occur. It is, however, more likely that the lines of migration to and from the northwest have more to do with this.

The town of Blacksburg, and the Virginia Polytechnic Institute are at the head of an extensive, elevated valley, through which several small streams converge, uniting to form a larger, which finally empties into the New River, At intervals, along these

streams, are marshy bottoms, which used to be quite extensive, before they were drained, and which attract snipe in the migrations, and other wading and marsh-loving birds. Below the college campus, an artificial causeway, acting as a dam, allows the flooding during the fall, winter, and early spring, of about two acres of meadow, for an ice-pond, and in spite of much passing of vehicles over the causeway, the pond proves very attractive to water-fowl during the migrations. I have killed fifteen species of ducks, two of grebes, three of gulls, and one tern upon this pond, and have twice seen Canada Geese. Bald Knob Mountain, one of the higher peaks in the State is within fifteen miles of the town; and is remarkable for the extensive lake almost at its summit. The surrounding region is quite wild.

As before indicated, the town is west of the Blue Ridge Mountains, and is near the summit of the Alleghany. It seems to be in the line of the autumnal migration for many warblers, and the spring migration for certain ducks, Nelson's Sparrow and other birds, as the list will more clearly point out.

With these introductory remarks, the list is presented as follows.

1. **Colymbus auritus**. HORNED GREBE.— A rare winter and spring visitor. Only five records, all on the college ice-pond; one in November, three in December and one in April; the latter specimen showing traces of the nuptial plumage.

2. **Podilymbus podiceps**. PIED-BILLED GREBE.— An occasional fall and spring visitor, in late October, late March, and early April. The spring specimens in breeding plumage.

3. **Gavia immer**. LOON.— Accidental. Three November records, all in immature plumage.

4. **Larus franklini**. FRANKLIN'S GULL.— One specimen, a female in fall plumage, was secured near the ice-pond on October 22, 1898 (see Auk, Vol. XIX, p. 74.) This I believe, is the first record of this species east of the Mississippi. The specimen is now in my collection.

5. **Larus delawarensis**. RING-BILLED GULL.— An occasional winter and spring visitor; with one exception, all in adult plumage. I have six records, all on the college ice-pond, by my house; one each for December, January, April and May, and two for March. The May record was of an immature specimen. My house is within fifty yards of the ice-pond, and a spy-glass hangs within easy reach of my study window, so that identifications can easily be made; and if necessary, the gun can be called into service.

6. **Larus philadelphia**. BONAPARTE'S GULL.— One visited the

ice-pond in late March, 1906, another in March, 1908, and a third on April 4, 1911; all adult birds, with white tails.

7. **Sterna forsteri**. FORSTER'S TERN.— Accidental. Two specimens "in the meat" were sent me from Abingdon, Va., where they had been killed on a small fish pond, in August. Both were immature birds.

8. **Sterna hirundo**. COMMON TERN.— One adult male was brought to me alive in June, 1895. It had been wounded, flying about Roanoke river, within five miles of Blacksburg.

9. **Hydrochelidon nigra surinamensis**. BLACK TERN.— On the afternoon of July 5, 1905, a heavy rainstorm or cloudburst, filled completely the bottoms and ponds, particularly the then empty ice-pond. An adult male Black Tern, in perfect plumage, was attracted to the pond, and was secured by me. This is my only record.

10. **Æstrelata hasitata**. BLACK-CAPPED PETREL.— (Plate XXIV.) The terrible storm of August, 1893, which wrought such havoc on the South Atlantic coast, brought this ocean waif, in an emaciated condition, into my hands. At the time of record (see Auk, Vol. X, p. 361) it was, I believe, the third specimen of this species recorded for the United States. Newton, in his Dictionary of Birds, page 709, refers to this specimen. It is now in the collection of Dr. Jonathan Dwight, Jr.

11. **Lophodytes cucullatus**. HOODED MERGANSER.— A spring visitor, usually seen in pairs; on one occasion a male and two females were together. I have four records, all from the college ice-pond.

12. **Anas platyrhynchos**. MALLARD.— A regular fall, winter and spring visitor. I have seen as many as fourteen in one fall flock. In the winter and spring they are generally in pairs, or three to four together. Months of record are October, November, December, February, March and April; as early as October 17 and as late as April 23.

13. **Anas rubripes**. BLACK DUCK.— A winter and spring visitor, not abundant; usually in December and March, though I have one record for January 17, and two for May 2, 1903, and May 1, 1911. Largest number seen at any time, a flock of five on December 16, 1902.

14. **Mareca americana**. BALDPATE.— Rare. A pair of males on the ice-pond, April 5, 1911, and three females, with a female Shoveller, on April 8, 1911. This was on a Sunday, and the ducks knew it; they stayed on the pond all day, and became so used to being observed, that I crept to within twenty feet of them, and observed them for some time. When tired of swimming, they came out on the grassy edge of the pond, roamed about awhile, and then huddled together, with their heads under their wings for a nap, just as domestic ducks do. They were gone by Monday morning.

15. **Dafila acuta**. PINTAIL.— Two records for late February and three for March. One male seen with three Mallards on the ice pond, in a snow storm; and again three male Pintails together. Other records are for single birds alone. Only one female, which was secured.

16. **Nettion carolinense**. GREEN-WINGED TEAL.— A pair seen in middle of March, and the drake secured.

17. **Querquedula discors**. BLUE-WINGED TEAL.— A regular spring visitor in March and April. All my records are from the college ice-pond.

18. **Spatula clypeata**. SHOVELLER.— Rare. One male with three females on the ice-pond on February 14, 1911. I secured the male which was in fine plumage. One female with three female Baldpates on the pond the whole of Sunday, April 9, 1911. These, my only records.

19. **Aix sponsa**. WOOD DUCK.— I killed a female that sprang from a ditch to which I was walking, October 19, 1901; and a pair, male and female, were seen at close range as they sprang from a stream in the open field, October 23, 1902.

20. **Marila americana**. REDHEAD.— Three records in March, 1911; one flock of eight birds on the wing; one fine drake, on the ice-pond, observed with the glass, and the next morning, one female, killed on the ice-pond.

21. **Marila valisineria**. CANVAS-BACK.— A magnificent drake of this species and a fine male Ring-neck were killed at one shot on the ice-pond on March 11, 1911. The breast and belly of the Canvas-back were richly suffused with brick-red, as was also the case with a drake Mallard secured in late February here.

22. **Marila affinis**. LESSER SCAUP DUCK.— A regular spring and winter visitor, in November, January, March and April, and one female as late as May 28. The largest flock seen at one time on the ice-pond, contained eighteen birds. One day in January a small flock of six, of both sexes, lit on the ice of the frozen pond, awkwardly walking about with their bodies held very erect. They remained, squatting on the ice for over an hour, when a passer-by scared them.

23. **Marila collaris**. RING-NECKED DUCK. In some numbers during March and April, 1906, as many as five together at one time. Only twice since have they been recorded. I have noticed with these and the Lesser Scaup Duck, that when diving, the tail is always spread, and is deflexed as the head is dipped under water.

24. **Charitonetta albeola**. BUFFLE-HEAD.— One male was killed on the ice-pond May 1, 1898. The only record for this locality.

25. **Erismatura jamaicensis**. RUDDY DUCK.— One specimen, an adult female, was killed on the ice-pond, November 10, 1910.

26. **Branta canadensis canadensis**. CANADA GOOSE.— In former years, in the early nineties, several flocks could be seen or heard every spring. These have become rarer. My records are mostly in March from the 3rd to the 28th; one for February 22, one in early April, and I have a female in my collection, killed together with two others, on New River, five miles from here, on May 9, 1901. I have seen a flock of thirty-eight fly over my yard, within gun-shot.

27. **Botaurus lentiginosus**. BITTERN.— Doubtless more common than it appears to be; I have only five records; October and November, April and May.

28. **Ardea herodias herodias**. GREAT BLUE HERON.— An infre-

quent visitor, mostly in late April, and one, as late as June. Taken April 17 in fine breeding plumage.

29. **Florida cærulea**. LITTLE BLUE HERON.— Recorded on the strength of several reports that two "White Cranes" (!) were seen at sundry times during August in one year at a near-by pond. Most likely the young of this species, as one that was shot, but which I did not see, was reported to have had the wing feathers "smoky."

30. **Butorides virescens virescens**. GREEN HERON.— A summer resident, breeding in suitable localities. Arrives as early as April 4.

31. **Nycticorax nycticorax nævius**. BLACK-CROWNED NIGHT HERON. — A fine female was secured by me on July 14, 1903. The ovaries appeared to be active.

32. **Rallus elegans**. KING RAIL.— One male brought to me alive, caught by the foot in a musk-rat trap on November 12. Oddly enough, the same day, a Song Sparrow was also caught in another musk-rat trap. Doubtless this rail occurs more frequently.

33. **Rallus virginianus**. VIRGINIA RAIL.— One record in October, and one in May, both birds secured and examined by me. Doubtless more frequent.

34. **Porzana carolina**. SORA.— A regular fall and spring migrant, sometimes abundant in October. Appears as early as September 1. Specimens in full nuptial plumage obtained in early May.

35. **Gallinula galeata**. FLORIDA GALLINULE.— A fine female was shot by me in the top of a maple tree on the College campus on May 1, 1903. This is my only record. I have often thought that a more impossible record could hardly be conceived of; a bird of the salt sea marshes, in the top of a tree, on the summit of the Alleghany Mountains!

36. **Fulica americana**. COOT.— One record for October, and two for April; two obtained and one seen so closely as to make its capture unnecessary.

37. **Philohela minor.** WOODCOCK.— A number of records, singly and in pairs, in April, July, August and October. Not abundant, but occurring often enough to elicit no surprise when one is seen. It may breed, but I have no data.

38. **Gallinago delicata**. WILSON'S SNIPE.— Fairly abundant during the spring migrations, arriving early in March, the average big flight occurring about April 4, and an occasional one seen as late as April 29. Seen also in October and November, though not as numerous as in the spring, and occasionally a lone specimen remains by an open spring during December and even into January. No data as to breeding.

39. **Macrorhamphus griseus griseus**. DOWITCHER.— Two specimens seen and killed on September 5, 1908, after heavy easterly rains, in company with Pectoral and Least Sandpipers, and Killdeers.

40. **Pisobia maculata**. PECTORAL SANDPIPER.— Fairly regular as a spring migrant, in small flocks, from late March through April 8, and occasional in September.

41. **Pisobia minutilla**. LEAST SANDPIPER.— Three seen on August 19, 1903, and eight on September 5, 1908. Specimens obtained on each occasion.

42. **Totanus melanoleucus**. GREATER YELLOW-LEGS.— One September record and four in April. These, in five separate years.

43. **Totanus flavipes**. YELLOW-LEGS.— Frequent, from early March through April 29 and again in September, from the 5th, through 26th. As many as eight seen together in one flock.

44. **Helodromas solitarius solitarius**. SOLITARY SANDPIPER.— A regular visitor in April and May, and again in August and September. In August, at times, anything but solitary; I have seen over ten at one time in a small bog about a quarter of an acre in extent.

45. **Bartramia longicauda**. UPLAND PLOVER.— Summer resident; breeds. Arrives as early as April 6 and here until August 19. Alighting on fences and trees when their breeding places are invaded.

46. **Actitis macularia**. SPOTTED SANDPIPER.— A spring and summer resident. I have found the downy young on the College experiment grounds, attended by their anxious parents. Arrives, April 13; latest seen, August 8.

47. **Ægialitis semipalmata**. SEMIPALMATED PLOVER.— One specimen, seen August 16, 1909 in company with Killdeers. Recognized by its cry and with the telescope.

48. **Oxyechus vociferus**. KILLDEER.— Practically a resident; I have records for every month in the year, and I believe for every day. Scarcest in December, and some years wanting in extreme January weather. Breeds, and mates as early as March 25. Young in the down seen in early May.

49. **Colinus virginianus virginianus**. BOB-WHITE.— Resident; breeds; fairly abundant. Coveys occasionally seen on the college campus.

50. **Bonasa umbellus umbellus**.— RUFFED GROUSE.— "Pheasant." Resident; breeds. Occasional "red-ruffed" males are seen. Noticeably scarcer than twenty years ago.

51. **Meleagris gallopavo silvestris**. WILD TURKEY.— Twenty years ago this was not infrequent in the nearby mountain ravines. It is now rare.

52. **Ectopistes migratorius**. PASSENGER PIGEON.— Whether or not I saw six of these birds in the late fall of 1892 near Blacksburg, I am unwilling now to assert positively, though my notes for that date contain the item. I have shot them in Bath County, Va., when a boy, in 1877. At intervals, during recent years, remarkable tales about their reappearance have gotten afloat. Thus, in December, 1907, the late Chas. K. Worthen wrote, "I have just read that a lot — thousands — of Wild Pigeons had lately settled in the neighborhood of Webster, W. Va. Do you know or can you find out if so?" Upon this, I wrote to Mr. Earle A. Brooks, of that place, who replied that he had had many inquiries, and had heard many positive statements, in answer to his own investigation of the rumors,

from persons who stated positively that they saw flocks of Wild Pigeons, from one to a thousand birds, but "no positive evidence, no specimens, heads, wings or feathers, no statement from any reliable bird student have been received. Many things point to their occurrence in the State last fall." And again this Fall — 1911 — a persistent report reached me that Wild Pigeons in some numbers were seen near Pulaski, Va., not far from here. But that they were very wild, and allowed no one to get within gunshot of them, though many efforts were made to secure some. I failed, however, to "nail" this rumor, and could never find the man who had seen them, though many said they had heard others say that they had seen the birds. I mention these rumors for what they may be worth.

53. **Zenaidura macroura carolinensis**. MOURNING DOVE.— Common resident; breeds.

54. **Cathartes aura septentrionalis**. TURKEY VULTURE.— Resident. In the caves and among the rocks that overhang the New River near here, the "Turkey Buzzard" breeds in some numbers. I have had several sets of eggs from there, and in late May, the 26th, I once saw a nearly fledged young, about the size of an ordinary hen, in one of these caves.

55. **Catharista urubu**. BLACK VULTURE.— Very rare; three records. On October 8 and 9, 1909, there was one Black Vulture with the number of Turkey Vultures that frequent the Experiment Station cattle grounds. The square-cut tail, shorter alar expanse, and quicker flap of the wing, as well as the different tone of black, and the position of the feet in flight, were diagnostic of the bird, in contrast with the Turkey Vultures with which it was flying. On March 12, 1911, I also saw one specimen, and on January 22, 1912, I saw five in company with one Turkey Vulture. In Charleston, S. C., my old home, I used often to note the marked contrast in many respects between these two species.

56. **Circus hudsonius**. MARSH HAWK.— Common in the fall and winter months, and seen as late as April 2. A large proportion of my winter records are for blue males. I have no breeding records.

57. **Accipiter velox**. SHARP-SHINNED HAWK.— Not very abundant. Seen at odd times throughout the year. A pair seen together in early May, evidently male and female, gives color to a report of their breeding in the neighborhood. On one occasion I saw one attacking a Red-headed Woodpecker, which, however, eluded the hawk.

58. **Accipter cooperi**. COOPER'S HAWK.— Of constant occurrence, though not abundant; breeds. One nest with young found in an old crow's nest.

59. **Astur atricapillus atricapillus**. GOSHAWK.— Very rare. One adult female, of rather small size brought in to me, recently shot, after a cold, windy snowstorm, November 19, 1906. The specimen was in fine plumage.

60. **Buteo borealis borealis**. RED-TAILED HAWK.— A fall and winter resident. My records are for October 30, through November, December, January, February and up to March 31. Most abundant in December and January.

61. **Buteo lineatus lineatus**. RED-SHOULDERED HAWK.— While most abundant during the months of November, December, and February I have records for this hawk for practically every month in the year. Specimens that I have killed had frogs and salamanders, and insect remains — principally grasshoppers — in their stomachs. I have a number of breeding records for this locality.

62. **Buteo platypterus**. BROAD-WINGED HAWK.— Not uncommon from May 7 to September 25; breeds. I saw a flock late in September all flying southwest; they were single, in pairs, and threes, fourteen altogether, and strung out for some distance. Occasionally one would circle for a time, and then resume the line of flight. I have come across a pair in the woods in the late spring, near the tree evidently chosen as a nesting site, from which they valiantly attacked and drove away a Red-shouldered Hawk; I was attracted at this time, and since, by their whining call, which at first I thought was a boy whistling. An incubating female was brought to me on May 18 by a farmer, who said that it had a nest in a large oak tree near his home, and that it was killing his chickens, and that he had shot it just after it had eaten a chicken. I skinned it and opened the stomach in his presence, and showed him, to his astonishment, that its crop contained the remains, easily distinguishable, of a young rat. I visited the nesting place with the intention of obtaining the eggs, but found the nest nearly seventy feet up in an enormous white oak, whose main trunk was fully five feet in diameter, and so gave it up, as I had no climbing irons.

63. **Aquila chrysaëtos**. GOLDEN EAGLE.— An irregular fall and winter visitor. Nine specimens recorded, of which I have actually handled six. I have one record for August 15. My other records being in November, December, and February. A female, brought to me in December, measured seven feet, one and one-half inches in extent; this was a young bird. One old male, in fine plumage, I secured on December 1. It had the nape of a deep rich gold, and the tail was fully barred.

64. **Haliæetus leucocephalus leucocephalus**. BALD EAGLE.— Rare. I have handled two specimens in the dark, immature plumage, secured in January and December, and saw one adult, with white head and tail, soaring over the campus, at a great height.

65. **Falco peregrinus anatum**. DUCK HAWK.— One specimen only, seen in October.

66. **Falco columbarius columbarius**. PIGEON HAWK.— One freshly killed specimen was brought to me in September, the skin of which is now in my collection.

67. **Falco sparverius sparverius**. SPARROW HAWK.— Practically a resident and breeds. Noted every month in the year; they frequent the ivy-covered buildings on the campus, feeding on English Sparrows. The stomach and crop of one individual shot on the campus were densely packed with crickets. A family of fully fledged and flying young seen as late as July 17. I saw one catch a young Robin and perch with it on a telephone pole near one of the buildings, and calmly eat its capture in contempt of the onslaught of several excited adult Robins.

68. **Pandion haliaëtus carolinensis**. OSPREY.— Not infrequent in the spring months. I have one record for March, eight for April, in different years, one for May, and one for September. On April 17, 1909, three were in sight at once, circling over the campus.

69. **Aluco pratincola**. BARN OWL.— Occasional. Seven specimens, four males and three females, have come to my hands, in April, May, September and June.

70. **Asio flammeus**. SHORT-EARED OWL.— Occasional in the late fall, in marshy places. I have four records only.

71. **Strix varia varia**. BARRED OWL.— Common resident; breeds.

72. **Otus asio asio**. SCREECH OWL.— Abundant resident; breeds.

73. **Cryptoglaux acadica acadica**.— SAW-WHET OWL.— One specimen reported to me in January last, seen on a window-sill in the early morning. The description was very accurate, and I have no doubt that the bird was this species.

74. **Bubo virginianus virginianus**. GREAT HORNED OWL.— Resident and breeds, though not abundant; have seen partly fledged young as late as April 7.

75. **Coccyzus americanus americanus**. YELLOW-BILLED CUCKOO. — Summer resident; breeds. First arrivals, May 1, usually May 5. Nest and eggs May 19.

76. **Coccyzus erythrophthalmus**. BLACK-BILLED CUCKOO.— Summer resident; breeds. First arrivals April 26, usually May 5–9. The two species are about equally abundant here.

77. **Ceryle alcyon alcyon**. BELTED KINGFISHER.— My records of the Kingfisher, beginning with March 10, run through April, May, June, and July to August 7. I believe it breeds in suitable localities, though I have no definite record.

78. **Dryobates villosus villosus**. HAIRY WOODPECKER.— A frequent fall and winter visitor, as early as September 10 and as late as February 18.

79. **Dryobates pubescens medianus**. DOWNY WOODPECKER.— Resident; breeds. Earliest nesting record, April 27.

80. **Sphyrapicus varius varius**. YELLOW-BELLIED SAPSUCKER.— Apparently a spring and fall visitor. My spring records are from March 25. to April 17, and again in October. These are the only months for which I have it recorded.

81. **Phlœotomus pileatus abieticola**. NORTHERN PILEATED WOODPECKER.— Resident, though rare now, save in remote mountain ravines. In the early '90's it was much more abundant.

82. **Melanerpes erythrocephalus**. RED-HEADED WOODPECKER.— Practically a resident, though winter records vary with the severity of the season. Abundant in spring and summer, mating as early as March 25. My records run through every day of the year. At times this species is a decided nuisance in gardens, ruining the ears of corn in the garden patch.

83. **Centurus carolinus**. RED-BELLIED WOODPECKER.— Apparently only a winter resident. My records start with September 27 and end with February 20.

84. **Colaptes auratus luteus**. NORTHERN FLICKER.— Usually seen every month in the year, though infrequent or wanting in severe winters. During the past winter 1911–1912, which was very severe, several were on the campus throughout December, January, and February. Mates as early as March 25.

85. **Antrostomus vociferus vociferus**. WHIP-POOR-WILL.— Arrives April 13. Last appearance September 28. In this region, very local in its habitat, seldom seen or heard in the immediate neighborhood of Blacksburg, or of the college grounds, but more frequent in adjoining valleys and ravines to the northeast and southwest. I have no breeding records.

86. **Chordeiles virginianus virginianus**. NIGHT-HAWK; BULL-BAT. — Summer resident; breeds; not common save during the late summer and fall flights. First arrival, April 26; begins flocking July 10; big flights throughout September, and last seen October 7.

87. **Chætura pelagica**. CHIMNEY SWIFT.— Summer resident; breeds. Earliest arrival April 12, latest April 28. Average arrival during my twenty years' observation, April 19. Prepares for migration about October 4, when incredible numbers collect in the evenings, whirling round, in decreasing circles, and descend spirally into their chosen chimneys for the night. Latest record, October 20.

88. **Archilochus colubris**. RUBY-THROATED HUMMINGBIRD.— Summer breeding resident. Very abundant at the trumpet blooms of the Tecoma vines on the college buildings in July. Arrives April 19, and latest seen, October 8. One nest, watched from its very beginning, was started May 15, incubation commenced June 5, young nearly full fledged June 20, and feeding on Tecoma blooms June 28.

89. **Tyrannus tyrannus**. KINGBIRD.— Summer breeding resident, abundant. Earliest arrival, April 19, and latest arrival April 26. Seen throughout September into October.

90. **Myiarchus crinitus**. CRESTED FLYCATCHER.— Summer resident, breeds; abundant. Earliest arrival, April 25; latest, April 30. Not seen after August 26.

91. **Sayornis phœbe**. PHŒBE.— Breeds, abundant. Earliest arrival, March 11; latest, March 27. Nest and eggs as late as June 12. At least two broods.

92. **Myiochanes virens**. WOOD PEWEE.— Breeds frequently in the apple trees around my house. Earliest arrival, April 30, last seen September 30.

93. **Empidonax flaviventris**. YELLOW-BELLIED FLYCATCHER.— Arrives April 30, last seen September 23. Common.

94. **Empidonax virescens**. ACADIAN FLYCATCHER.— Throughout the summer. Arrives May 9, latest seen October 11. Common.

95. **Empidonax minimus**. LEAST FLYCATCHER.— Common in orchards throughout the summer. First seen, March 19; latest, September 9.

96. **Otocoris alpestris praticola**. PRAIRIE HORNED LARK.— In flocks in open fields and on the campus throughout the fall and winter.

Arrives as early as November 9 and generally leaves in late March, about the 20th. Two seen as late as April 14, in 1905. I have collected specimens at various times from their first arrival and on, towards the end of their stay, throughout a number of years, and all have been the smaller and paler form, *praticola*.

97. **Cyanocitta cristata cristata**. BLUE JAY.— Like the Whip-poor-will, rarely seen in the valley in which Blacksburg lies, though common in a valley to the southwest, and in another to the northeast where the Roanoke River flows. I have eight records only, for the college campus, in April, May, August and October.

98. **Corvus corax principalis**. NORTHERN RAVEN.— I saw a pair of Ravens on the summit of Whitetop Mt. in Washington Co., Va., in September; this is the highest mountain in the State, and reaches the Balsam zone. On May 9, 1903, while collecting in a ravine near Blacksburg, I heard a hoarse, crow-like 'quonk,' and looking up, saw a Raven pursued by two Crows. Here there was no question of identity, as the size, shape, and cry of the Raven were in marked contrast with the characters of the noisy, smaller, aggressive Crows.

99. **Corvus brachyrhynchos brachyrhynchos**. CROW.— In the sense that Crows are always here, I suppose this bird can be called a resident, though I am unable to say whether the breeding birds go south in winter, and are replaced by migrating northern birds, as is the case with Robins. I think the same birds are here throughout the year. They pair in late March and are building by April 9.

100. **Dolichonyx oryzivorous**. BOBOLINK; RICE-BIRD.— A spring and fall migrant; very constant in date of spring arrival, coming as early as April 25, or at the latest, April 29, and remaining until May 14. The males arrive first and are in song throughout their short stay; in some years the females are as abundant, though usually the small flocks contain nearly all males. They are seen all over the open campus, and are usually known as 'May-birds.' In the fall, they arrive, in the Rice-bird plumage, about Spetember 9 and are then very fat, and frequently in some numbers, and there is a succession of small flocks until September 22, when all depart. During this period, the 'clink' of passing birds can be heard throughout the night.

101. **Molothrus ater ater**. COWBIRD.— I have noted flocks of this species, of mixed sexes, from January 19 through April 23; most common throughout March.

102. **Agelaius phœniceus phœniceus**. RED-WINGED BLACKBIRD.— February 22 seems picked out as the usual date for the arrival of the Red-wing, in small flocks of males, the females arriving later, and apparently not abundant until April, when mating begins. First nests observed May 13; eggs on May 19, and young flying by June 10.

103. **Sturnella magna magna**. MEADOWLARK.— Resident. Very tame on the campus, where they are protected and are found in the hardest winter weather, seeking open places over the pipe and sewer lines where the

ground is thawed. I have seen fledged young as early as May 13; have found nests with eggs throughout May, and one nest with fresh eggs as late as July 12. I think two broods are usual, and possibly three occasionally.

104. **Icterus spurius**. ORCHARD ORIOLE.— Breeds; arriving as early as April 26, and is building by May 16. Very constant in the date of arrival, April 26 to 29 being the range of variation.

105. **Icterus galbula**. BALTIMORE ORIOLE.— Breeds. Range of first arrivals is from April 23 to April 30. Latest seen, August 22. Nest with eggs, by May 16. They frequent the potato patches with the fledged young and feed freely on potato beetles.

106. **Euphagus carolinus**. RUSTY BLACKBIRD.— A spring and fall migrant. Flocks of rusty individuals arrive about October 19 and are here until late in November. I have one record of one individual for December 31. A few begin to return by February 27. By March 8 full plumaged birds are here and remain until March 19 when they pass on.

107. **Quiscalus quiscula quiscula**. PURPLE GRACKLE.— Single specimens of the Crow Blackbird occasionally occur throughout the winter months; thus I have one record for December 29, 1904, one for January 17, 1907, and one for February 18, 1906. The earliest advent noted, in small flocks, is February 20; by March 8 the returning flocks are increasing in numbers. Earliest eggs noted are for May 20. By July 4, those breeding near each other begin to flock, young and old going out in the morning to feed in flocks, and returning together at sunset. By mid-October flocking for migration is evident, numbers leaving and being replaced by more northern flocks, which stop over for a few days in their flight, until by October 27 all are gone. About this time and later they are replaced for a few days by small flocks of the Bronzed Grackle.

108. **Quiscalus quiscula æneus**. BRONZED GRACKLE.— In small flocks from October 18 until November 20. One seen January 20, and a doubtful record was given me for March 10.

109. **Carpodacus purpureus purpureus**. PURPLE FINCH.— A winter and spring migrant. From February 15 to May 1. Most abundant in March and April. Seen also early in November.

110. **Loxia curvirostra minor**. CROSSBILL.— Saw one male on a fir tree on the campus, on January 16. I was attracted by its note, and got easily within thirty feet of it and watched it for some time. The odd occurrence of this species in the summer months in unlikely southern localities has been noted: by Wayne, at Yemassee, S. C., for two or three years; and by Wirt Robinson, in Nelson Co., Va., in July. So it was no surprise to me to find a flock in the town limits of Blacksburg on June 12, 1909, which remained for several days, and specimens therefrom were brought me for identification.

111. **Astragalinus tristis tristis**. GOLDFINCH.— A roving resident. Here every month in the year. Plumage of the males changing in late April. A late breeder; eggs as late as August.

112. **Spinus pinus**. PINE SISKIN.— Occasional in the winter. In 1908, a large flock was here continually from December 26 until May 4, 1909.

113. **Pœcetes gramineus gramineus**. VESPER SPARROW.— Summer resident, breeds. Earliest arrival, March 17; last seen, November 2. Abundant.

114. **Passerculus sandwichensis savanna**. SAVANNAH SPARROW.— Winter resident, from October 5 to April 8. Abundant.

115. **Ammodramus savannarum australis**. GRASSHOPPER SPARROW.—Summer resident; breeds. A late spring migrant, arriving in late May or early June, and here until October 10. Abundant.

116. **Passerherbulus nelsoni nelsoni**. NELSON'S SPARROW.— A fine female, in fresh plumage was brought into the house by my cat on May 23, 1908. (See Auk, Vol. XXV, p. 475.) Possibly occurs regularly at or about this date, but apt to be overlooked or mistaken in the grass for the Grasshopper Sparrow.

117. **Zonotrichia leucophrys leucophrys**. WHITE-CROWNED SPARROW.— Specimens in breeding plumage, mostly males, arrive May 6 and are gone by May 9. Again, in the fall, brown-headed individuals, in some numbers, October 13–22. Very constant in date, and seldom here over three days.

118. **Zonotrichia albicollis**. WHITE-THROATED SPARROW.— Abundant in April and October. Earliest fall arrival, October 9 and gone by November 12. In Spring, from April 6 to May 8.

119. **Spizella monticola monticola.** TREE SPARROW.— An abuncant winter resident, flocking, twittering and singing in company with the Juncos, from November 22 to March 10.

120. **Spizella passerina passerina**. CHIPPING SPARROW.— An abundant summer breeder, in evidence from March 11 to October 22, building by May 2.

121. **Spizella pusilla pusilla**. FIELD SPARROW.— Abundant, arriving Mar. 13 and here until November 5. Eggs by May 2.

122. **Junco hyemalis hyemalis**. SNOWBIRD; JUNCO. Though I have examined many in early fall and throughout the season, I have found only the typical northern form; yet I feel sure that *carolinensis* must occur. Arrives October 12 and here in abundance until April 22 singing during the latter part of its stay.

123. **Junco hyemalis carolinensis**. CAROLINA JUNCO. Not identified. Reported to breed on the top of White-top Mountain, in Washington Co., Va., where I have seen Juncos in August.

124. **Peucæa æstivalis bachmani**. BACHMAN'S SPARROW.— Accidental. One specimen, May 2, 1906. (See Auk, Vol. XXIII, p. 341.)

125. **Melospiza melodia melodia**. SONG SPARROW.— Resident. Singing on cold, snowy, winter days, with a hope of Spring in its song. Building April 16, and eggs as late as July 13. Two-, and possibly three-brooded.

126. **Melospiza lincolni lincolni**. LINCOLN'S SPARROW.— Only three specimens seen, and all obtained, two in early May, and one on September 28.

127. **Melospiza georgiana**. SWAMP SPARROW.— Apparently only a winter resident. Observed from October 5 to March 11. Abundant along banks of streams and in marshy places.

128. **Passerella iliaca iliaca**. FOX SPARROW.— Not abundant. Observed in small numbers or singly, from October 15 to November 24, and again from February 25 to March 17.

129. **Pipilo erythrophthalmus erythrophthalmus**. TOWHEE.— An abundant breeding summer resident. Arrives April 9, males usually preceding the females. Latest seen, October 24. In moulting plumage throughout September.

130. **Cardinalis cardinalis cardinalis**. CARDINAL.— Resident. Not abundant. Several pairs nest on the campus and are here all winter and throughout the year. Eggs as early as April 29. Fledged young flying with old birds as late as July 20.

131. **Zamelodia ludoviciana**. ROSE-BREASTED GROSBEAK.— A rare spring and fall migrant. Two males killed April 29 and one seen May 3, a female on September 19 and a young male September 23, complete my record for this immediate locality. I know it to breed in Taylor's Valley, near White-top Mountain.

132. **Passerina cyanea**. INDIGO BUNTING.— An abundant summer resident and a late breeder. Arrives April 26 and last seen October 12.

133. **Piranga erythromelas**. SCARLET TANAGER.— Common in the spring migration. I doubt if it breeds here. Arrives as early as April 29 and incidentally seen through April and as late as May 16. On several occasions in May, I have seen a number together; thus on May 16, 1907, five males in the top of one oak tree; on May 9, 1908, three males together, and on May 12, 1903, two males and one female together. Red males pass south July 4 to 17 [1] and females and young from August 22 to September 23.

134. **Progne subis subis**. PURPLE MARTIN.— A constant but not abundant summer resident. Breeds in the Martin boxes set out for it. Arrives March 22, though more often later, most of my "First arrivals" being early in April. Nesting by June 5. Last seen September 1.

135. **Petrochelidon lunifrons lunifrons.** CLIFF SWALLOW.— An abundant summer breeding resident. Arrives May 7, and flocks for departure in late July.

136. **Hirundo erythrogastra**. BARN SWALLOW.— Abundant summer breeding resident, sometimes arriving too early for safety, and killed by early April freezes. First arrival noted April 6. Flocks by July 20 and gone by September 5.

137. **Iridoprocne bicolor.** TREE SWALLOW.— A spring migrant. All of my records are for April, from the 5th to the 28th. Not seen at other times.

138. **Riparia riparia**. BANK SWALLOW.— Seen from April 1 to August 11. Whether I have ever mistaken on the wing the Rough-winged Swal-

[1] It would seem more probable that they pass into the green plumage at this date. ED.

low for this species here, I do not know; all the specimens I have killed at various times have been Bank Swallows.

139. **Bombycilla cedrorum**. CEDAR WAXWING.— A summer breeding resident. In flocks from March 5 until May, when pairing begins. A pair built in an apple tree within a few feet of my house, and were so quiet that I did not know of the nest until the young were nearly fledged. Flocks again by September, and seen until October 27.

140. **Lanius ludovicianus ludovicianus**. LOGGERHEAD SHRIKE.— Occurs sparingly throughout the year, commoner in fall and winter. I have no breeding records. The honey-locust trees on the campus often contain shrews and small meadow mice impaled on their thorns. On one occasion, I saw a Shrike catch a Junco, this was in February; and one cold December day I saw one eating the dried remains of impaled grasshoppers and caterpillars on a thorn bush.

141. **Vireosylva olivacea**. RED-EYED VIREO.— An abundant summer breeding resident, arriving by April 19, and here until September 16.

142. **Vireosylva gilva gilva.** WARBLING VIREO.— Breeds in the orchard around my house, where its song is heard throughout the spring and summer. Arrives April 23 and latest seen September 27. Common.

143. **Lanivireo solitarius solitarius**. BLUE-HEADED VIREO.— Apparently only the typical species occurs here; in the spring, from April to May 2. Rare.

144. **Lanivireo flavifrons**. YELLOW-THROATED VIREO.— A woodland summer resident. First arrival noted April 14; last seen August 20, though it probably occurs later. Common.

145. **Mniotilta varia**. BLACK AND WHITE WARBLER.— Abundant throughout the spring and summer. Earliest seen April 10, and latest September 5. Families of old and young in early July.

146. **Helmitheros vermivorus**. WORM-EATING WARBLER.— Arrives April 28, wanting after July 23. One pair found nesting on June 2, and eggs hatching on the 5th, and the young flying by June 23. Common.

147. **Vermivora chrysoptera**. GOLDEN-WINGED WARBLER.— Not common, but breeds; one nest with young, found June 5. Arrives May 5.

148. **Vermivora celata celata**. ORANGE-CROWNED WARBLER.— One specimen obtained October 2.

149. **Vermivora peregrina**. TENNESSEE WARBLER.— A migrant, abundant in the fall from September 16 to October 10. Apparently wanting in the spring migrations, probably taking some other line for the vernal flight.

150. **Compsothlypis americana usneæ**. PARULA WARBLER.— An abundant breeding summer resident, building its lichen-suspended nests in the Usnea on crab-apple trees and Cratægus. Full plumaged males here by April 13. One pair commenced building nest April 30, finished by May 8, incubation was in progress May 13 when the nest was destroyed by some boys. Flying young are abundant by mid-July.

151. **Dendroica tigrina**. CAPE MAY WARBLER.— A fall and spring

migrant. Fine plumaged males taken in late September and young are passing until October 26. One adult male in song on the campus on May 6; this is my only spring record.

152. **Dendroica æstiva æstiva**. YELLOW WARBLER.— An abundant summer breeding resident. Arrives April 13. Building by May 14 in apple trees.

153. **Dendroica cærulescens cærulescens**. BLACK-THROATED BLUE WARBLER.— Common in the spring and fall migrations; from April 20 to May 9 and from September 16 to October 9.

154. **Dendroica coronata**. MYRTLE WARBLER.— Common in low shrubbery, and careless of approach throughout October; frequenting tree tops and wary from April 18 to May 9, during which period it is often in song, and in nearly perfect vernal plumage. One record for March 14.

155. **Dendroica magnolia**. MAGNOLIA WARBLER.— A common spring and abundant fall migrant; May 8 to 13 and September 10 to October 9; the fall specimens mostly immature.

156. **Dendroica cerulea**. CERULEAN WARBLER.— A very rare spring warbler, only two specimens ever seen here by me; May 2, 1891, and May 1, 1893, the latter secured.

157. **Dendroica pensylvanica.** CHESTNUT-SIDED WARBLER.— An uncommon spring migrant, a few pairs stopping to breed. Two nests with eggs, May 23, 1909, are my only breeding records. Very abundant in the fall migrations, from July 18 to September 10. The earlier fall records being possibly locally bred birds.

158. **Dendroica striata**. BLACK-POLL WARBLER.— Only two spring records, May 16, 1903, and May 15, 1907, both full plumaged males. Very abundant in the fall from September 23 to October 9.

159. **Dendroica fusca**. BLACKBURNIAN WARBLER.— Another rare spring migrant, but abundant in the fall. I saw and heard a full plumaged male in song on the campus, May 14, 1910, and one other, May 2, 1892. Common throughout September in immature plumage.

160. **Dendroica virens**. BLACK-THROATED GREEN WARBLER.— A common spring and abundant fall migrant. Found during the latter part of April, in breeding plumage, and from July 20 to October 6. May possibly breed, as the July records are all immature birds.

161. **Dendroica vigorsi**. PINE WARBLER.— Very rare here; two specimens obtained September 14.

162. **Dendroica palmarum hypochrysea**. YELLOW PALM WARBLER. — Two adults secured May 3; abundant in the fall from September 30 to October 22.

163. **Dendroica discolor**. PRAIRIE WARBLER.— Only two records, May 2 and September 3, latter a young bird.

164. **Seiurus aurocapillus**. OVEN-BIRD.— An abundant breeding summer resident. Earliest arrival April 26, and latest seen October 12. Nest with fledglings June 9.

165. **Seiurus motacilla**. LOUISIANA WATER-THRUSH.— This, the

only form seen here, breeds along water courses in wooded ravines. Arrives April 9; latest record October 10. I have killed and closely watched many, to see if the slender-billed *noveboracensis* occurred, but have found every specimen to be the large-billed form. Near Charleston, S. C., many records that I have are all of *noveboracensis*.

166. **Geothlypis trichas trichas**. MARYLAND YELLOW-THROAT.— A summer resident, breeding; common. Arrives May 8; not seen after September 27.

167. **Icteria virens virens**. YELLOW-BREASTED CHAT.— Abundant; breeds. Arrives April 29. Seen in its 'dropping song' May 3; latest noted September 16, a female.

168. **Wilsonia citrina**. HOODED WARBLER.— Apparently rare in the spring, May 12 the earliest record. Seen again July 30 and common in August and up to September 15.

179. **Wilsonia pusilla pusilla**. WILSON'S WARBLER.— Occasional. Two spring records, May 12, 1906, and May 15, 1907; and three records for September 20 and 28, 1892, and September 10, 1910.

170. **Wilsonia canadensis**. CANADA WARBLER.— One specimen only, August 15.

171. **Setophaga ruticilla**. REDSTART.— A summer resident, arrives April 30 and remains until September 30.

172. **Anthus rubescens**. PIPIT.— A winter visitor. In flocks on the bare fields from October 19 to April 2. In severe winters, not seen in January or February.

173. **Mimus polyglottos polyglottos**. MOCKINGBIRD.—An irregular and uncommon visitor or resident, I hardly know which to say. For the past three years, two have been constant residents on the campus, and are reported to have bred. Before this, my records, oddly enough, are for the late fall and winter months only.

174. **Dumetella carolinensis**. CATBIRD.— Summer breeding resident; abundant. Arrives April 26; latest seen October 10. Building by May 12.

175. **Toxostoma rufum**. BROWN THRASHER.— An abundant summer resident, from April 10 to October 9. Earliest nest and eggs, June 3.

176. **Thryothorus ludovicianus ludovicianus**. CAROLINA WREN.— Resident; its bright, voluble song heard throughout the winter. Full fledged young, May 16.

177. **Thryomanes bewicki bewicki**. BEWICK'S WREN.— Abundant; a breeding summer resident, nesting in holes in fence rails, on beams under houses, in barns and corn cribs, and other suitable places. Arrives March 17, seen and heard until September 30; one stray specimen January 22, 1903. Commences to build by March 28, nesting all through April, and nest and eggs found as late as May 11.

178. **Troglodytes aëdon aëdon**. HOUSE WREN.— A common summer resident, building in holes in the brick walls of the college buildings. Seen from April 24 to September 23.

179. **Nannus hiemalis hiemalis**. WINTER WREN.— Occasionally seen. Some half dozen records from October 9 to November 16.

180. **Cistothorus stellaris.** SHORT-BILLED MARSH WREN.— One specimen secured, October 24. Suitable localities not very numerous in this mountain land.

181. **Telmatodytes palustris palustris.** LONG-BILLED MARSH WREN.— Frequent, from April 28 to October 30. I have found one nest, but do not think it is a regular breeder, owing, perhaps, to the scarcity of suitable marshy places.

182. **Certhia familiaris americana**. BROWN CREEPER.— It may be my fault that I have seen this inconspicuous little bird only from April 10 to May 1, and from October 10 to February 18, apparently more common in the fall and winter, when the trees are bare. On one occasion, clad in khaki I was standing motionless watching a Creeper on an oak tree near by, when the bird flew downward and lit on my leggings, and scrambled nearly up to my waist, when it took fright and flew away.

183. **Sitta carolinensis carolinensis**. WHITE-BREASTED NUTHATCH.— Resident, and fairly abundant.

184. **Sitta canadensis**. RED-BREASTED NUTHATCH.— I secured two on August 12, 1899, which seemed to be young, just fledged. One other obtained September 1.

185. **Penthestes carolinensis carolinensis**. CAROLINA CHICKADEE.— Resident. Common.

186. **Bæolophus bicolor.** TUFTED TITMOUSE.— Resident, and, with the former species, coming around dwellings in the winter; one specimen flying through an open window into a room. Breeds in holes in trees, building April 13, nesting April 28, and with young May 30.

187. **Regulus satrapa satrapa**. GOLDEN-CROWNED KINGLET.— March 28 to April 15, and October 15 to December 29. Two records in January, 10 and 30, 1902. Abundant during the migrations.

188. **Regulus calendula calendula**. RUBY-CROWNED KINGLET.— One record, January 30, 1902, in company with *R. satrapa satrapa*. Abundant from April 10 to 23, its wonderful song then heard occasionally. In the fall, in great numbers from September 27 to November 22.

189. **Polioptila cærulea cærulea**. BLUE-GRAY GNATCATCHER.— Frequent, from April 17 to May 9. One record July 18, and two for September 2 and 20.

190. **Hylocichla mustelina.** WOOD THRUSH.— An abundant summer resident, from April 26 to September 30.

191. **Hylocichla fuscescens fuscescens**. VEERY.— A spring migrant, from April 30 to May 6. Common.

192. **Hylocichla ustulata swainsoni**. OLIVE-BACKED THRUSH.— To distinguish with certainty this species from the Hermit Thrush, and others closely related, when sitting, flying or hopping in dense and dark underbrush, without committing murder, is not given to all ornithologists. I have only two positive records of the Olive-back, May 9 and 13. One

bird obtained and the other identified with certainty. At other times I have been unwilling to say positively as to the species, and have killed too many Hermits to make sure, and have latterly preferred to remain in doubt, rather than kill.

193. **Hylocichla guttata pallasi**. HERMIT THRUSH.— Common from March 6 to May 8 and from October 12 to November 2.

194. **Planesticus migratorius migratorius**. ROBIN.— I have records of individuals and flocks for every month in the year. About September 18 the breeding birds start south, and are succeeded throughout the fall and winter by more northern birds, the most northern probably making this region the average limit of their southern migration, going a little south from here in severe winter weather and returning with every mild change. This past winter (1912), a very severe one, numbers of Robins have been on the campus throughout January and February. Spring migrants begin to return by February 22, waves of migration pass through in March; by April 11 building is going on. There are, I think, at least three broods, certainly two. In 1900 I found partially fledged and fluttering young on April 6.

195. **Sialia sialis sialis**. BLUEBIRD.— Practically resident and breeding about the houses in suitable holes; nest building as early as March 24. In cold weather, feeding on the berries of ampelopsis, on the piazza of my house. Some times absent for a period during very severe winter weather; though some winters, here through the whole season.

SUMMARY.

Residents.

Killdeer.
Bob-white.
Ruffed Grouse.
Turkey.
Mourning Dove.
Turkey Vulture.
Cooper's Hawk.
Red-shouldered Hawk.
Sparrow Hawk.
Barred Owl.
Screech Owl.
Great Horned Owl.
Downy Woodpecker.
Pileated Woodpecker,
Red-headed Woodpecker.
Flicker.
Blue Jay.
Crow.
Meadowlark.
Goldfinch.
Cardinal.
Mockingbird.
Carolina Wren.
White-breasted Nuthatch.
Carolina Chickadee.
Tufted Titmouse.
Robin (see note).
Bluebird.

Summer Residents.

Green Heron.
Woodcock.
Upland Plover.
Spotted Sandpiper.
Sharp-shinned Hawk.
Broad-winged Hawk.
Yellow-billed Cuckoo.
Black-billed Cuckoo.
Kingfisher.
Whip-poor-will.
Nighthawk.
Chimney Swift.
Ruby-throated Hummingbird.
Kingbird.
Crested Flycatcher.
Phœbe.
Wood Pewee.
Yellow-bellied Flycatcher.
Acadian Flycatcher.
Least Flycatcher.
Red-winged Blackbird.
Orchard Oriole.
Baltimore Oriole.
Purple Grackle.
Vesper Sparrow.
Grasshopper Sparrow.
Chipping Sparrow.
Field Sparrow.
Towhee.
Indigo Bunting.
Purple Martin.
Cliff Swallow.
Barn Swallow.
Bank Swallow.
Cedar Waxwing.
Red-eyed Vireo.
Warbling Vireo.
Yellow-throated Vireo.
Black and White Warbler.
Worm-eating Warbler.
Golden-winged Warbler.
Parula Warbler.
Yellow Warbler.
Chestnut-sided Warbler.
Oven-bird.
Louisiana Water-Thrush.
Maryland Yellow-throat.
Yellow-breasted Chat.
Redstart.
Catbird.
Brown Thrasher.
Bewick's Wren.
House Wren.
Long-billed Marsh Wren.
Wood Thrush.

Winter Residents.

Red-tailed Hawk.
Hairy Woodpecker.
Red-bellied Woodpecker.
Prairie Horned Lark.
Savannah Sparrow.
Tree Sparrow.
Junco.
Swamp Sparrow.

Spring Visitors.

Ring-billed Gull.
Bonaparte's Gull.
Hooded Merganser.
Baldpate.
Green-winged Teal.
Blue-winged Teal.
Redhead.
Canvas-back.
Ring-necked Duck.
Buffle-head.
Canada Goose.
Great Blue Heron.
Osprey.
Nelson's Sparrow.
Tree Swallow.
Blue-headed Vireo.
Cerulean Warbler.
Veery.
Olive-backed Thrush.

Fall Visitors.

Wood Duck.
Ruddy Duck.
King Rail.
Least Sandpiper.
Short-eared Owl.
Bronzed Grackle.
Tennessee Warbler.
Pine Warbler.
Winter Wren.
Short-billed Marsh Wren.

Late Winter and Spring Visitors.

Black Duck.
Pintail.
Shoveller.
Cowbird.
Pine Siskin.

Spring and Fall Visitors.

Pied-billed Grebe.
Bittern.
Virginia Rail.
Sora Rail.
Coot.
Wilson's Snipe.
Pectoral Sandpiper.
Greater Yellow-legs.
Yellow-legs.
Solitary Sandpiper.
Barn Owl.
Sapsucker.
Bobolink.
Rusty Blackbird.
White-crowned Sparrow.
White-throated Sparrow.
Lincoln's Sparrow.
Fox Sparrow.
Rose-breasted Grosbeak.
Scarlet Tanager.
Cape May Warbler.
Black-throated Blue Warbler.
Myrtle Warbler.
Magnolia Warbler.
Black-poll Warbler.
Blackburnian Warbler.
Black-throated Green Warbler.
Yellow Palm Warbler.
Prairie Warbler.
Hooded Warbler.
Wilson's Warbler.
Golden-crowned Kinglet.
Ruby-crowned Kinglet.
Blue-gray Gnatcatcher.
Hermit Thrush.

Fall, Winter and Spring Visitors.

Horned Grebe.
Mallard.
Lesser Scaup Duck.
Marsh Hawk.
Purple Finch.
Pipit.
Brown Creeper.

Fall and Winter Visitors.

Golden Eagle.
Loggerhead Shrike.

Summer Visitors.

Little Blue Heron.
Black-crowned Night Heron.
Canada Warbler.
Red-breasted Nuthatch.

Accidental.

Loon.
Franklin's Gull.
Forster's Tern.
Common Tern.
Black Tern.
Black-capped Petrel.
Florida Gallinule.
Dowitcher.
Semipalmated Plover.
Black Vulture.
Goshawk.
Bald Eagle.
Duck Hawk.
Pigeon Hawk.
Saw-whet Owl.
Raven.
Crossbill.
Bachman's Sparrow.
Orange-crowned Warbler.

NUMBER OF SPECIES — RECAPITULATION.

Residents	28
Summer Residents	55
Winter Residents	8
Spring Visitors	19
Late Winter and Spring Visitors	5
Fall Visitors	10
Spring and Fall Visitors	35
Fall, Winter and Spring Visitors	7
Fall and Winter Visitors	2
Summer Visitors	4
Accidental	19
Unclassified or Hypothetical	3
	195

It will be noted that I have not included in this list the omnipresent English Sparrow. This does not imply that we are favored above surrounding regions. My division of seasons is not exactly that usually given, but I thought this more minute division would give more exactly the times of appearance of visitors.

GENERAL NOTES.

Laughing Gulls in Plymouth County, Mass.— While spending the first part of August at Manomet Point, Mass., I was surprised to note the abundance of *Larus atricilla* off the point. During calm weather I saw every day a hundred or more in the vicinity of the point, generally keeping pretty well together. On August 13 I noted about thirty on Fresh Pond, a large body of water situated about a half a mile from the shore. They were characteristically noisy both on the water and when circling about the pond. About sixty per cent of the birds seen were in juvenal plumage.

This is the first summer I have seen this species in Plymouth Co., though Mr. Barret has recorded it. (Auk, Vol. 29, Jan., 1912, p. 99).— W. Sprague Brooks, *Milton, Mass.*

Brown Pelican on Pamlico Sound and at Durham, N. C.— An unusual spring visitation of Brown Pelicans was observed at Ocracoke, N. C., this season. The writer, with his assistant, Mr. T. W. Adickes, spent the week of May 20–25 at this point and, covering this period, Pelicans were daily in evidence. The center of their abundance seemed to be on the shoals and 'lumps' in and opposite the Inlet, where a flock of something over a hundred made their headquarters. Two specimens were collected on May 24, both of which proved to be males, with the sexual organs but little developed. One of them was in quite immature plumage, the other having the white head of the adult.

The two boatmen who waited on us while there — one of them having been game warden in the Cape Hatteras region for several years, and quite familiar with the bird life of the locality — reported another flock of about a hundred seen on the lumps between Hatteras and Ocracoke on their trip to the latter place on May 20.

This species is not uncommon at times on lower Pamlico Sound during the late summer, but this is our first record of the bird as a common spring visitant to the region.

On May 29 a female, approaching the adult stage of plumage, was collected on a small pond close to the large West Durham cotton mill. It was received at the museum in the flesh. The ovaries showed no indication of its being a breeding bird.— H. H. Brimley, *Raleigh, N. C.*

The Man-o'-war-bird (*Fregata aquila*) **on the Coast of Georgia.**— Mr. J. J. Sutton of Ridgeville, Georgia, recently sent to the Biological Survey a photograph of a specimen of *Fregata aquila* captured last June near the Sapelo Lighthouse in McIntosh County on the coast of Georgia, a few miles northeast of Darien. Mr. Sutton furnishes the following account of the capture of the specimen:

Mr. Wm. G. Cromley, a taxidermist, while on a visit to his brother,

keeper of the Sapelo Lighthouse, on June 8, 1912, saw the bird coming in from the sea, circle about the lighthouse several times, and then proceed due west. After two or three minutes it changed its course and started out to sea again. As it passed the lighthouse Mr. Cromley heard the report of a gun and saw the bird come down. He secured it, mounted it, and the specimen is now in his possession.

The Man-o'-War-bird was apparently first recorded in the list of Georgia birds more than sixty years ago. Through the kindness of Mr. Arthur H. Howell, my attention has been called to White's list of the birds of the State, which appeared in a little known work published at Savannah in 1849.[1] The appendix contains a nominal list of 273 birds found in the State, including the present species, but without comment or reference to any records. The present specimen seems to be the first definite record for the State.

As is well known, *Fregata aquila* occasionally strays northward some distance along both coasts and in the interior. On the Atlantic Coast Audubon recorded the fact as early as 1835 that it 'rarely travels farther eastward than the Bay of Charleston in South Carolina' (Ornith. Biog., III, p. 495), and Grinnell in 1875 intimated that it had been found as far north as Long Island.[2] Beside the Georgia bird at least nine other specimens have been reported from points north of Florida: namely, in 1859, 1871 (?), 1876, 1877, 1884, 1886, 1893, 1906, and 1910. The species has been recorded three times from South Carolina[3] — from Mt. Pleasant, August 26, 1893, and October 19, 1910, and Sullivan Island, at the entrance of Charleston Harbor, October 20, 1906; and has been taken once in New Jersey,[4] at Cape May Court House, in the spring of 1877; once in New York,[5] on Gardiners Island, August 4, 1886; once in Connecticut,[1] on Faulkner Island, in the autumn of 1859; and once in Nova Scotia,[6] off Halifax Harbor, October 16, 1876. It has also been reported from the coast of Maine and from Quebec, but in neither case was the specimen preserved. Stearns states in his New England Bird Life (II, p. 342, 1883): "Mr. Purdie's manuscript informs us that a specimen was taken, but not preserved, about twelve years ago [1871?], at Booth Bay, Maine," and Comeau reports that one was seen and shot at on August 13, 1884, at Godbout, Quebec.[7] Those who know the care and accuracy of these observers may be inclined to accept the Purdie and Comeau records although not quoted in the Check-List.— T. S. Palmer, *Washington, D. C.*

---

[1] George White's 'Statistics of the State of Georgia.' Cat. Fauna, p. 11, 8vo. Savannah, 1849.
[2] Grinnell, Am. Nat., IX, p. 470, 1875.
[3] Wayne, Auk, XXVIII, p. 107, 1911.
[4] Maynard, Birds Eastern N. Am., p. 473, 1881.
[5] Dutcher, Auk, V, p. 173, 1888.
[6] Deane, Bull. Nutt. Ornith. Club, IV, p. 64, 1879.
[7] Merriam, Auk, II, p. 113, 1885.

Mallard and Black Ducks at Currituck, N. C.— In looking over the shooting logs of three of the Currituck Duck Clubs the following rather interesting facts with regard to the relative frequency of Mallards and Black Ducks in Eastern North Carolina were brought to light.

The Swan Island Club is at the northern end of the sound, near its junction with the Back Bay of Virginia. The Currituck Club is some thirty miles farther south. At the former club the number of the different species taken, has only been kept for the past three years, seasons 1909–10 to 1911–12, while at the Currituck Club there are twenty-four years of records. During the twenty year period 1888–89 to 1909–10 the proportions at the Currituck Club were Mallards 47%, Blacks 100%, and this proportion does not vary essentially from season to season. It runs up as high as 80% and as low as 15%. This last happened only once, in 1899–00, and is in marked contrast to any other seasonal figure, except the season just past. The greatest Mallard year at Currituck Club was the season 1904–05.

Mr. John E. Thayer suggests that the large number of Mallards at the Currituck Club may be accounted for by the heavy baiting with corn. If this is so, it is a fact of some economic interest, but Swan Isle has also used corn, though to a less extent.

At Swan Isle for the last three winters, 1909 to 1912, the Mallards are only in the proportion of 11%. The last three seasons have certainly been poor Mallard years, but at Currituck Club they have yielded a proportion of 30%, nearly three times as great as Swan Isle.

At the False Cape Club, some fifteen miles north of Swan Island in Virginia, I have figures for the last six seasons, 1906–07 to 1911–12. The Mallards are 23%, Blacks 100%, while at Currituck Club for the same six seasons the Mallards are 37%. This shows more Mallards at False Cape than at Swan Isle, both relatively and absolutely, but the proportion of Mallards to Blacks is not nearly as great here as at the Currituck Club. We probably have to do with a question of artificial attraction which suggests that the Mallard shows a greater 'susceptibility' to corn and other grains than does the Black Duck.

For the northern part of the sound we have found from eleven to twenty-three per cent., and at the southern end, thirty-seven to forty-seven per cent., but this difference can hardly be significant in a geographical sense.

Another figure of interest can be considered. There is a chance that the Mallard is not holding out so well in numbers as the Black Duck, owing to greater interference over its breeding area. Thus we must compare an old period at Currituck Club, 1888 to 1898, with a later period, 1898–1910. The early period shows 55% of Mallards and the later one only 44%, a decrease of 9%, but this decrease is more apparent than real, because the Black Ducks have more than doubled their average yearly numbers from the first period to the second, while the Mallards are on an average a little less than twice as numerous. It is therefore probable that the Mallard is not holding out so well in this region as is the Black Duck.

The properties of all the Currituck Clubs are now gunned more systematically than in the old days, so that larger yearly averages do not necessarily point to an increase in actual numbers of the species.

A fact relative to the dispersal of the Mallard is brought out plainly by comparing the proportionate numbers of Mallards and Black Ducks month by month at Swan Isle. The season opens November 10 and ends the first of March. I give below the proportion of Mallards to Blacks month by month for the three seasons, 1909–10, 1910–11, 1911–12, and also the actual numbers of the Mallards themselves.

1909–10		Actual Nos.	1910–11		Actual Nos.	1911–12		Actual Nos.
Nov., 09	20%	50	Nov., 10	28%	107	Nov., 11	11%	29
Dec., 09	8.7	38	Dec., 10	20	95	Dec., 11	8	12
Jan., 10	7.7	16	Jan., 11	8.2	23	Jan., 12	2.2	4
Feb., 10	9.5	16	Feb., 11	10	7	Feb., 12	2.4	2

It is easy to see that there is a great falling off of Mallards from November to January. I believe that the diminishing numbers after November indicate the passing along of a flight.

I should attribute the extraordinarily small numbers of Mallards killed in the past season, 1911–12, at Swan Isle, to the fact that the Club cut down by at least one-half the usual output of bait, were it not for the fact that this was a very lean year for Mallards at the Currituck Club, the proportion being only 17% and the actual numbers well under one half of the usual bag. This is very nearly as low as the bad Mallard year of 1899–1900 which as mentioned above gave only 15%. Mr. Thayer assures me that the Currituck Club records can be absolutely relied upon, and I can vouch for the last three years at Swan Isle.— J. C. Phillips, *Wenham, Mass.*

Dispersal of the Australian Duck (*Anas superciliosa*).— In 1911 an old pair of these birds was allowed to hatch and bring up nine young. These were banded on August 17 (not unfortunately with the American Association bands), and placed in the Wood Duck pond, where they grew their flight feathers. Late in September these young birds began to move about the place. They remained very tame. I know of three that were shot in Wenham. Two individuals, however, stayed about until December 17. By that time they had become fairly wild, having of course been more or less persecuted. After December 17 none was seen until mid-winter, when on February 20, 1912, a single one came back and was found in the winter duck yard. It allowed a close approach so that its band was plainly visible, and then flushed and flew away in an easterly direction. Up to the present date (Aug. 20) no more have returned.

The Australian duck, *Anas superciliosa* (I disregard the genus *Polionetta* because it serves no useful purpose as far as I am aware), is a widely distributed species, probably nearly, if not entirely non-migratory. As given

by Salvadori in the Catalogue of Birds, Vol. 27, it occurs 'from Java and Timor to Southern New Guinea, Australia, New Zealand sub-region, and Polynesia, including the Pelew Islands.'

Mr. Gregory M. Mathews writes me under date of Aug. 14, 1912, that there are several subspecies of this duck outside Australia which he is inclined to admit as valid because this bird is not a real migrant, although it flies long distances at times.

The return of one of my Australian ducks on February 20, suggests that there was no attempt at migration, and that the birds were either starved out or shot in this neighborhood.— J. C. PHILLIPS, *Wenham, Mass.*

The European Teal (*Nettion crecca*) **again Returning to Wenham, Mass.**— In 'The Auk,' 1911, page 366, I told of the migration and return of a European Teal raised in captivity here at Wenham. The bird arrived April 19, 1911 after an absence since December 6, 1910.

All summer of 1911 this bird was in or near the pond. On November 25 our captive fowl were placed in winter quarters, and our Teal vacated. Four other poorly pinioned European Teal escaped at the same time, having grown outer secondaries or new primaries long enough to enable them to fly. Our bird, however, did not leave until December 31, as she was seen several times about the pond and lake until that date. Wenham Lake closed during the first few days of January, 1912, the fall having been extremely mild.

On the morning of April 18, 1912, our bird was again back in the pond where she was hatched, having arrived during the night or early morning; thus completing her second migration. That day she was quite shy, and flushed immediately, but soon returned. I saw her first on April 20. She was then perfectly tame and could with difficulty be driven from the pond.

On April 23 another Teal appeared in the pond; whether an escape of last fall, or some other bird, can only be conjectured. This bird did not remain long, however.

It is fair, I think, to consider the first arrival the same bird as before reported, though there is no absolute evidence. The dates of spring arrival on the two years are I think interesting.— J. C. PHILLIPS, *Wenham, Mass.*

Northern Eider in South Dakota; a new record for the interior of North America.— It is my privilege to announce the capture, November 4, 1911, of a Northern Eider, *Somateria mollissima borealis*, in Lake County, eastern South Dakota. The identification is by the Biological Survey. Wells W. Cooke writes 'not only the first record for South Dakota, but the first record for the whole interior of North America.' Adrian Larson of Sioux Falls, who at my suggestion sent the specimen to Washington for identification, supplies the following notes: This bird, which is either a female or an immature male, was shot about forty miles north in a lake region 'locally called Madison Pass.' The severe cold

wave of November 1 and 2, 1911, brought the ducks south almost by the millions. The Eider was shot by a Doctor Page of Sioux Falls and is now in the possession and displayed in the place of business of William Sweet of this city.— S. S. Visher, *University of South Dakota, Vermillion, S. D.*

Records from Nippinickett Pond, Bridgewater, Mass.— The captures of the following ducks on Nippinickett Pond seem worthy of record. European Widgeon, *Mareca penelope*, Nov. 7, 1902. Shot by A. C. Dyke.

Two European Widgeons, *Mareca penelope*, Oct. 22, 1910, from a flock of 4 birds. Shot by Harry P. Sturtevant.

European Widgeon, *Mareca penelope*, Oct. 23, 1910. Shot by A. C. Dyke.

Hutchin's Goose, *Branta canadensis hutchinsi*, Oct. 8, 1910, from a flock of six birds, the other five being Canada Geese. Shot by Messrs. Frank C. Drake and Irving A. Hall.

All the specimens were obligingly identified by Mr. Wm. Brewster of Cambridge.— Arthur C. Dyke, *Bridgewater, Mass.*

Sora Rail (*Porzana carolina*) **in New Mexico.**— On the morning of August 27, 1912, at State College, New Mexico, I picked up, dead, an immature Sora Rail that had flown against a telephone wire and broken its neck. On the night of August 23, 1912, about 10 o'clock P. M., a flock of birds flew over me on the mesa, headed northeast — away from the Rio Grande. The size of the birds and their manner of flight, as seen by the moonlight, in conjunction with the finding of the above specimen, lead me to believe these birds were of the same species.

To my knowledge, this is the first specific record of this species in the state, certainly in this locality. There has been an unusual amount of rainfall in this region during the month of August, which may account for their presence here at this time, for our mesa country offers no inducements to them naturally.— D. E. Merrill, *State College, N. M.*

Early Occurrence of the White-rumped Sandpiper (*Pisobia fuscicollis*) **in Maine.**— A male White-rumped Sandpiper in nuptial plumage was secured on April 27, 1912, at Scarborough Maine. The bird was alone.

The only other instances of its occurrence in the state in spring, known to me, are those recorded by Mr. Nathan Clifford Brown, May 30, 1881, and May 29, 1882.[1] Both of these recorded by Mr. Brown are in the collection of the Portland Society of Natural History, and the one here recorded in that of the writer.

The bird according to Mr. W. W. Cooke is rare on the Atlantic coast of the United States, in spring, north of Virginia,[2] and its occurrence at this

[1] Proc. Portland Society of N. H., II, p. 27.
[2] Bull. 35, U. S. Biol. Survey, p. 38.

season has been later than the close of the first week in May.[1]— ARTHUR H. NORTON, *Portland, Me.*

Uncommon Shore-birds seen in Essex County, Massachusetts.— Clark's Pond, Ipswich, July 24, 1912, one full plumaged Killdeer Plover (*Oxyechus vociferus*). Eagle Hill, Ipswich, July 31, 1912, before any shooting was allowed we found five Killdeer Plover. Four were feeding together in a marsh hole and one flew over. The birds were so tame we could see all their markings. When startled they flew uttering their 'Kill-dee' note. Eagle Hill, Ipswich, August 7, 1912, one Buff-breasted Sandpiper (*Tryngites subruficollis*,) in the grassy edges of Mr. A. B. Clark's pond. This was a new bird to me but easily identified by the general brownish yellow color and the specklings on the wings.

Nahant Beach, August 10, 1912, one Willet (probably *Catoptrophorus semipalmatus inornatus*) so exhausted after a long flight that, as it crouched on some seaweed, I thought the bird was wounded and went up to examine it. When I was within fifteen feet it stood up and stretched its wings over its back showing the beautiful black and white markings, the black axillars and the greenish legs. After a few moments the Willet took a short flight over the water giving its 'Pill-willy' notes, then returned to a clump of seaweed just ahead of me and there I left it.

Clark's Pond Ipswich, August 14, 1912, one Willet seen at close range.

Clark's Pond Ipswich, August 17, 1912, the same Willet, which Mr. Maynard said was a young Western Willet.

Eagle Hill, August 28, 1912, three Killdeer Plover apparently in full plumage.— LIDIAN E. BRIDGE, *West Medford, Mass.*

Killdeer (*Oxyechus vociferus*) **at Lancaster, Mass.**— I have a small pond of about three acres where I keep a collection of ducks. This year owing to the drought it was very low and the muddy shores afforded good feeding ground for any waders that might come along.

On June 16, I was surprised to hear the note of a Killdeer and going to the pond I discovered four. They seemed very tame and were busily occupied in feeding. This was in the afternoon. They remained for about an hour, then flew off. The next morning they were back again and remained until about 11 o'clock, then disappeared. The same afternoon they came again and remained until 5 o'clock, when they flew away. This continued until June 26, when I shot two, which proved to be adult males in worn plumage. The other two came back the next day. On June 30, two new ones appeared with the other two, making four in all on the pond that day. On July 1, 2, and 3, only three were seen. They remained until July 6, when they disappeared and they have not been seen since.

When they left the pond they always flew in the same direction — towards the big Clinton reservoir. My theory is that these birds bred there last year and as the shores were very low it afforded them excellent feeding

[1] l. c.

grounds, but when they returned this year, conditons were altered, the reservoir being filled to the brim. This compelled the birds to hunt for a different feeding ground and in hunting about they found my pond.— JOHN E. THAYER, *Lancaster, Mass.*

Ocracoke Water Bird Notes.— On Royal Shoal, a small island belonging to the North Carolina Audubon Society, and situated some eight or nine miles northwest of Ocracoke, we found the following birds nesting: Laughing Gull, Common Tern and Oyster-catcher. The Gulls were in the midst of their laying, as were the Common Terns. Three pairs of Oyster-catchers inhabited the island. One nest was found with the eggs about ready to hatch, and one pair had young nearly grown, two being the complement in each case. The Black Skimmers were preparing their nesting hollows, but had not yet begun to lay. The Royal Terns seem to have almost deserted this island — where they were so numerous four or five years ago — for islands farther to the eastward, and the Least Terns are mostly back on the beaches.

The total number of eggs of the Laughing Gull and Common Tern was something over two hundred.

A flock of twenty Cormorants left the 'lump' as we approached.

A small petrel, presumably a Wilson's, was seen flying up the sound on May 23, after a rather stormy night. On the same date we found Black Skimmers very plentiful, though not yet laying, on the island in the middle of Ocracoke Inlet, with a few Common Terns nesting. Common Tern, Least Tern and Oyster-catcher were all, apparently, nesting on the beach, the Common Terns mostly on the south side of the Inlet. Young of the Oyster-catcher were seen, from a quarter grown up to the flying stage, in each case in broods of two.

This island was almost completely swept by the storm tide of the previous night, which may have destroyed a good many Tern eggs. There were many more birds around than the number of nests warranted. The few nests found were all on the small, unswept area, of course.— H. H. BRIMLEY, *Raleigh, N. C.*

Oreortyx in Idaho.— Notes appearing in 'The Auk' of April, 1911 and 1912, refer to the range of *Oreortyx* being extended eastward to near the Idaho-Oregon line,— specifically, Vale, Oregon. My observation is that not only has it been long established in southwest Idaho, but that its range extends at least 125 miles beyond the Oregon line.

Four years ago a covey of eight along Indian Creek several miles northwest of Nampa was wiped out by hunters. Two years ago a number were taken in the Boise bottoms eight miles north of this place. For ten years more they have been common in the Owyhee foothills some forty miles south of Nampa; in fact, so numerous are they that hunters from here regularly visit that section at the opening of the shooting season, two guns on one occasion killing 44 Quail in two hours.

A rancher from Twin Falls, 100 miles south and 145 miles east of Vale, Ore., tells me the 'Blue Quail' appeared there several years ago, while a report from Shoshone, 75 m. south and 150 east of Vale, says they are becoming plentiful near that place. I am unable to verify by personal observation either of these last reports, but have no reason to doubt them.

It is a fair supposition that the birds taken near Nampa were 'explorers,' merely crossing the valley to the hills beyond, where they will doubtless be found soon if indeed they are not already established there.

I have examined numerous birds in the flesh from the Owyhee section and would pronounce them typical *plumifera*, though I have not the material in my collection for a comparison. Hunters insist that they find another variety, similar in coloring but smaller and with shorter plumes.— L. E. Wyman, *Nampa, Ida.*

Passenger Pigeon (*Ectopistes migratorius*) **in Alberta.**— The records of the Passenger Pigeon printed of late in 'The Auk,'[1] cover practically all of its former range except the extreme northwest. The account of its occurrence in Alberta is contained in a little known book entitled 'Saskatchewan and the Rocky Mountains. A diary and narrative of travel, sport, and adventure, during a journey through the Hudson's Bay Company's Territories in 1859 and 1860. By the Earl of Southesk.' Edinburgh, 1875, 1–448. On May 28, 1859, when in northwestern Minnesota near Pembina, he says, "I stalked and shot some pigeons." When near Qu' Appelle Fort, Saskatchewan, July 2, they "discovered a few pigeons in a little grove." From Edmonton, Alberta, the party went westward and August 22, when near the Lobstick River the record reads, "We also saw a good many pigeons, one of which I shot with my rifle. They were plump, compact little birds, and made delicious eating." The next day, when a few miles further west, two were shot.

These are apparently the first and only records of the Passenger Pigeon in Alberta.— Wells W. Cooke, *Biological Survey, Washington, D. C.*

The Band-tailed Pigeon (*Columba fasciata fasciata*) **in North Dakota.**— Recently I have been having some interesting correspondence with Mr. C. J. Campbell, whose home is at Englevale, North Dakota. From the Editor of 'Outer's Book' I learned that Mr. Campbell had shot a specimen of the Band-tailed Pigeon near Englevale, and I investigated the matter until I was satisfied of the truth of the statement; and now, with his permission, I publish his last letter to me on the subject, it being dated at his home on the 1st of July, 1912, and runs as follows:—"Dear Sir:— In reply to your letter of June 27th I am perfectly willing you should publish the facts as stated in any of my letters. The Band-tailed Pigeon referred to was shot by me on the evening of June 2nd in this village, which is situated in Ransom Co., N. D., about 50 miles from the Minnesota State

[1] 1910, 428; 1911, 346 and 427.

line and about 30 from the South Dakota line. I could not tell the sex. I only saw the one bird. When first seen a pair of Kingbirds were chasing it and it flew into a thick willow hedge to escape them. This Pigeon was about the size of a Passenger Pigeon or a trifle smaller, white collar around back part of neck. The end of tail square, that is tail feathers all of equal length. When the tail feathers were held spread out it plainly showed the band of dull or dirty white.

Yours truly,

CHAS. J. CAMPBELL."

There may be some significance in the capture of this bird so far off its range, when taken in connection with the outrageous slaughter of many hundreds of this species, which recently took place in Southern California, as described in the May–June (1912) issue of 'The Condor' (p. 108). R. W. SHUFELDT, *Washington, D. C.*

On the Alleged Egg-carrying Habit of the Band-tailed Pigeon.—In the July 'Auk' Mr. Wallace Craig protests at some length against the general acceptance of the belief that the Band-tailed Pigeon carries its egg from the nest on occasion, and incubates it on any limb of a tree on which it may happen to alight, as published in Bendire's 'Life Histories of North American Birds.' He remarks, quite rightly, that such an extraordinary act should not be believed except upon the best of evidence, which he asserts is not at hand.

Doubtless other western ornithologists besides myself have read with amusement this tale of the pigeon's actions, but without feeling the need of formally refuting the story. This, however, should have been done years ago, for such stories are sometimes repeatedly and widely quoted, as this one has been, until they are generally accepted as established facts. It is pertinent, in this connection, to refer to Mr. Herbert Brown's interesting account of the Masked Bob-white (Auk, XXI, 1904, pp. 209–213), where statements by Major Bendire's informant, referring to the species treated, and also quoted in Bendire's 'Life Histories,' are discussed and rated at about their true value.

Under the circumstances it is most unfortunate that many such statements and records should have been so widely repeated in ornithological literature. As the years go by such erroneous 'records' become increasingly difficult to correct, and while we can still do so, every effort should be made toward their elimination.

In this connection, and as an example of the insistence of an erroneous record, there can be cited the generally accepted statement of the Band-tailed Pigeons' breeding in southern Arizona during the entire year. This is positively asserted as an accepted fact in various books dealing with western ornithology, and is, I believe, traceable back to the same source as the egg-carrying tale. It is also contrary to fact. The Band-tailed

Pigeon is not resident in the parts of Arizona in which it breeds — the Transition zone — and there are no published records of breeding during the winter months. In fact, I do not know of a definite record of the occurrence of the species anywhere in the state in mid-winter, and I have had occasion to make careful search through ornithological literature dealing with Arizona.

Mr. Craig's objection is abundantly justified by the ridiculous nature of the story he cites, which, without a particle of corroborative evidence, has been so generally accepted as sober truth. It induces me to publish this statement regarding the character of other records from the same source.— H. S. Swarth, *Museum of Vertebrate Zoology, University of California, Berkeley, California.*

Pigeon Hawk in South Carolina in Winter.— On February 26, 1911, I took a specimen of this species (*Falco columbarius columbarius*) in the brown immature plumage in St. Andrews Parish, near Charleston. The skin is at present in the collection of the Charleston Museum. This is the first record for this species taken during the winter months. Mr. A. T. Wayne records (Auk, XXVIII, 1911, p. 265) the occurrence of two adults which he observed on Nov. 29, 1910, and Jan. 14 and 16, 1911, but was unable to secure. These records establish the Pigeon Hawk as a rare winter visitant in South Carolina.— Julian Mitchell, Jr., *Charleston, S. C.*

Red-headed Woodpecker at Newburyport, Mass.— On July 13, 1912, while engaged in photographing, in a mowing field, the nest and eggs of the Ring-necked Pheasant, my attention was caught by a flash of bold color in a nearby elm, and on the completion of my work with the camera, I went to investigate the owner of the brilliant plumage. Soon locating him on a dead limb near the upper centre of the tree, I readily recognized him as a Red-headed Woodpecker (*Melanerpes erythrocephalus*), an uncommon bird in this part of New England. I had a good view of him, covering a period of several minutes, as he explored the points of interest on the dead limbs of the tree. After a little while he took flight, in a northerly direction, but although I walked for some little distance, I was unsuccessful in getting another glimpse of him.

Inquiries in the neighborhood brought out the fact that he had been seen several times, earlier in the season, but I could find no one who knew of his breeding here. Doubtless he was a solitary wanderer who had strayed from his usual range.

Some twenty years ago a pair of these birds were found nesting in an old orchard in the southern end of the town. Just at the time that the four young, were ready to fly, the whole family was taken, and now graces the private collection of a resident of the town.— S. Waldo Bailey, *Newburyport, Mass.*

The Case of a Crow and a Ruffed Grouse.— On May 12, 1912, while automobiling through Stoughton, Mass., Mr. Charles A. Coolidge suddenly came upon a Crow flying slowly across the road with a heavy burden. In its efforts to escape, the Crow dropped its booty, which proved to be a dead Ruffed Grouse, still warm as in life.

My examination elicited the following facts: An adult female Ruffed Grouse, weighing one and a quarter pounds; abdomen entirely bare as in incubation; feathers back of right ear and below left eye stained with blood; eyes intact; many feathers on the right side of the neck and some on the left side, including the whole of the neck-tuft on that side, missing. An effusion of blood the size of a silver dollar in the muscles of the right breast, and a few small subcutaneous ones on both breasts; an irregular rent in the skin a quarter of an inch long behind the right ear, and much clotted blood there and around the exterior of the base of skull and neck; a slight tear in the skin below the left eye. The skull was not injured and the brain was intact. There were no signs of gun-shot injury.

The ovary was full of small eggs, none larger than a number six shot. The crop was stuffed with the young leaves and flower buds of the apple, and the stomach was filled with the semi-digested remains of the same. The bird was plump and in good condition, and showed no signs of disease.

The interpretation of these post-mortem findings and of the observed history is a matter for conjecture and the following theories are offered:

(1) That the Crow flying close to the ground in open woods perceived the incubating Grouse, who, trusting to her protective coloration, remained immobile on her nest, and received her death blow behind the right ear.

(2) That the Crow in attempting to steal the chicks of the Grouse was set upon by the irate mother with the disastrous results observed.

(3) That the Crow attacked the Grouse while busily engaged in budding the apple tree, and that the stunned bird fell to the ground where a few more blows finished it.

(4) That the Grouse was killed by a hawk, was abandoned and at once seized by the Crow.

(5) That the Grouse killed itself by flying against some obstacle, and that its dead body was at once taken by the Crow.

The fall of the Grouse to the ground before life was entirely extinct, which might have happened according to theory 3, 4 and 5 would account for the contusion and hemorrhage of the breast. This hemorrhage would not have occurred when the Crow dropped the dead body into the road. It hardly seems probable that a hawk would have abandoned such a rich booty, or that it would not have left marks of its talons. In the case of an obstacle one would expect to find hemorrhage over or under the front of the skull. By exclusion therefore, theory number 3 seems to be the most probable one.

In whatever way the tragedy occurred it is certainly surprising that a Crow should have succeeded in flying with such a heavy burden as a Ruffed Grouse, and on this account alone, if for no other, the case is worth putting on record.— Charles W. Townsend, M. D., *Boston, Mass.*

Concerning the Hawaiian Linnet.— In 'The Auk' for July, 1912, pages 336–338, Mr. John C. Phillips makes a contribution to the discussion of the interesting case of the Linnet of the Hawaiian Islands, where an apparent change in color has come about since the introduction of the bird forty of more years ago. The above writer's remarks were evidently stimulated by two things: He did not approve of the name *mutans*, this having been proposed by me in order to give the supposedly new form systematic standing; and his doubts were clearly strong as to the Hawaiian Linnet possessing any really distinctive character.

In the first place, I was chagrined that anyone after reading my former paper should interpret my use of the name *mutans* as signifying my belief that the Hawaiian Linnet owed its character to the definite process of late commonly called mutation. I see now that such an inference ought to have been anticipated, and I have a due feeling of humiliation. The word *mutans* was selected because it was the Latin equivalent of the present participle "changing," referring of course to the apparent existence in this case of a species *in process of change*,— not by any means through de Vriesian mutation, but by some other process, possibly one among those discussed in my previous paper.

In the second place, as to the value of the color-character which the Hawaiian Linnet displays, rather irregularly it is admitted, various considerations are mentioned by Mr. Phillips. One thing, however, certainly supports the notion that degree of redness (counting lemon yellow, cadmium yellow, orange, orange vermilion, poppy red, crimson, and various dilutions of these) may be a real racial or specific character, therefore of an intrinsic or germinal nature. This is, that over and over again in the best systematic writings on birds we find fine differences within this series of pigment colors recognized as perfectly good characters. The following genera among our North American Fringillidæ afford examples: Acanthis, Pinicola, Carpodacus (otherwise than in the disputed case), and Loxia. If such a character, whether or not in company with differences in size, etc., is of systematic value in any of these cases, why not in that of the Hawaiian Linnet?

The paramount interest in the problem under discussion, rests on the apparent fact that we have here a character *originating*, possibly becoming intrinsic; in other words, a species in process of change. Further collections of linnets from the Hawaiian Islands are immensely to be desired; and as Mr. Phillips suggests, someone must work with live birds under various conditions, so as to bring light from experimental sources.— J. Grinnell, *Museum of Vertebrate Zoölogy, Berkeley, California.*

The Acadian Sharp-tailed Sparrow and Other Birds at Plymouth, Mass.— The winter had been quite severe and on February 2, 1912, the harbor was nearly frozen over, only the channels, some distance off shore, being open. The shore was covered with snow and broken ice. Gulls and ducks were numerous around the open water in mid-harbor.

Where a small stream entered the harbor, I noticed quite a modification of the otherwise prevalent, boreal conditions. Waste water from some mills enters this stream, evidently raising the temperature considerably, for a mist hung over the stream and the beach was bare of ice and snow for some thirty feet on either side of the brook where it entered the harbor. The birds seemed to have taken advantage of this very local, climatic condition.

About a hundred Herring Gulls were feeding about the mouth of the stream; fifty Horned Larks were busy gleaning edible bits and two had a spirited contest for a choice morsel, while at times they twittered to each other in low, musical tones; and a bright and active Acadian Sharp-tailed Sparrow was noticed among the Larks. I observed it for some time, and it came within eight feet of me, searching for food among the sea-weed and stones, and rested for a minute or more upon a large beach stone. The creamy-buff appearance, of the back and head markings, breast and under-parts, longitudinal gray side streaks, the contour of the bill, and the sharp-tipped tail feathers were distinctly visible. I was pleased to note this species on our coast in severe mid-winter.

I am reasonably sure that this sparrow was not *maritimus* which species has some late, northern records, as its larger size and different bill would serve to identify it.

I continued my observations at this point about an hour and while here a male Golden-eye whistled overhead, so near that his attractive dress and white spot near eye were distinctly seen. Also a fine adult, male Great Black-backed Gull was noticed with some Herring Gulls near a channel.— CHARLES L. PHILLIPS, *Taunton, Mass.*

Notes on the Dickcissel in Colorado.— During the week of August fourth to eleventh, 1912, while visiting friends at the ranch of J. W. Ramsey, near Crook, Colorado, in company with Mr. Dean Babcock, of Estes Park, I was fortunate in finding a number of Dickcissels (*Spiza americana*). They were first seen and heard singing August 6. Mr. Babcock had been familiar with the bird in the east and he told me he felt positive of the song. As they were very wary some difficulty was experienced in getting within gunshot, but the first specimen was finally secured, confirming the primary identification. Five specimens in all were taken, four males and one female, a pair of which are now mounted in the Colorado Museum of Natural History. We saw at least twelve individuals on the sixth and on subsequent days in other fields, enough to make a conservative total of twenty for the vicinity.

They seemed to prefer the moist meadows of sweet clover and sunflower, rarely going to the adjoining grain fields. Their habit (so common with many birds) of remaining on the highest stalk in a clump while singing, rendered them very conspicuous but difficult to approach. The note which had proved so instrumental in the identification consisted of six syllables divided into two parts; the first part of two syllables, slightly slower and higher pitched than the last of four syllables.

All of the specimens collected were in more or less worn plumage, but only one had made any progress with a molt, and on this bird it is only noticeable in the tail, half of which was composed of new feathers.— F. C. Lincoln, *Assistant, Dept. of Ornithology, Colo. Museum of Natural History, Denver.*

Proper Name for the Nashville Warbler.— The specific name of the Nashville Warbler was changed in the eighth supplement to the A. O. U. Check-List from *ruficapilla* to *rubricapilla* because "Sylvia ruficapilla Wils. (1810), is preoccupied by Sylvia ruficapilla Lath. 1790." The fact is that *Sylvia ruficapilla* Latham, 1790, is not an original description, but is merely the placing in the genus *Sylvia* of *Motacilla ruficapilla* Gmelin, 1789, and as such does not preoccupy *Sylvia ruficapilla* Wilson.

Hence the name of the Nashville Warbler should be *Vermivora ruficapilla* Wilson, and the reference, *Sylvia ruficapilla* Wilson, Am. Orn. III, 1811, 120, pl. 27, fig. 3.— Wells W. Cooke, *Biological Survey, Washington, D. C.*

Abundance of the Cape May Warbler (*Dendroica tigrina*) **around Quebec.**— It is surprising to note that this rare warbler has been found very commonly in the woods around Quebec this spring, and even in the parks of the city. Two young ornithologists, P. W. Cook and A. W. Ahern, of this city, shot about fifteen, of which twelve were brought to me. They met with six to eight bands of the warbler, each containing something over a score of birds, and these in different localities, they seemed to be almost as numerous as the Myrtle Warbler. The first specimen seen, which was in company with a small flock of Black-throated Green Warblers, was shot on the 9th of May and by the 18th the species was very common. The last was seen on the 25th.

It has also been noticed that many other warblers were more common this spring than usually, especially the Blackburnian and Bay-breasted.— C. E. Dionne, *Quebec, Can.*

Mimicry in the Song of the Catbird.— Though belonging to a distinguished and accomplished family of singers numbering among its members such delightful songsters as the Brown Thrasher, Mockingbird and more distantly related Carolina Wren, the Catbird figures with a more modest pretention to song and until recently I had supposed its vocal powers limited to its own individual lyrical, and sometimes seemingly labored song. But on July 5, 1912, while working in a meadow adjacent to a small brook with its usual tangle of alder, raspberry and elder I noted with considerable surprise and interest, more so because of the day-light hour, 11 A. M., the song of a Whip-poor-will, somewhat subdued and minor in quality, but clear and distinct nevertheless. It was several times repeated from the nearby thicket. So out of the usual was it at this hour that I went at once to reconnoiter and was not a little surprised to find the

author, not a Whip-poor-will but a Catbird! So far as my observation extends he was certainly acting in a new *rôle*. Two or three times later in the day I heard the same performance repeated, and subsequent visits to the same locality have, on two occasions, enabled me to substantially confirm my first conclusions as to the accomplishments of this individual.

It is of further interest to note that in this particular locality the Whip-poor-will is seldom heard. One would have to travel several miles to a more 'brushy' or thickly wooded surrounding to hear them. These observations lead to the query, how then did the Catbird 'learn his lesson' and how much progress and to what degree do some individuals of the species attain in mimicry? — S. Waldo Bailey, *Newburyport, Mass.*

Another Occurrence of the Blue-gray Gnatcatcher in Essex County, Massachusetts.— I should like to record a full plumaged Blue-gray Gnatcatcher (*Polioptila cærulea cærulea*) seen in the pitch pine trees of the Ipswich Dunes on August 24, 1912.

The bird when first seen was flitting about the trees like a Kinglet uttering a curious little call note which at once attracted my attention. I coaxed the bird out on to the lower dead limb of a gray birch by squeaking, so that we were able to observe it carefully for ten of fifteen minutes although it was quite restless.

The bird was seen by Miss E. D. Boardman, Edmund Bridge and myself. — Lidian E. Bridge, *West Medford, Mass.*

A Third Blue-gray Gnatcatcher in Maine.— Late in the afternoon of August 25, 1912, I heard several times near my house on Vaughan Street, Portland, what I believed to be the call-note of the Blue-gray Gnatcatcher (*Polioptila cærulea cærulea*). It proceeded from the tops of tall elms, bordering the street, where a number of small birds were flitting about, all too far away, however, to be identified by the eye. About six o'clock, the next morning, I again heard the call-note, now coming from an apple tree on my lawn, and I soon got a fair view of its author at close range. After a moment or two he flew to an almost leafless old apple tree on a near-by vacant lot where, as I stood under the tree, I watched him at my leisure, often within six or seven feet. At last, up to this time quite alone, he flew away southward, a hundred yards or so, to a group of elms, cedars and other trees, and was at once lost in a numerous band of bird migrants.

If we are to accept the records[1] literally, only three Gnatcatchers, all told, have made their way to Maine; but to the writer, before whom the three examples have so casually presented themselves,— with a possible fourth not to be overlooked,— it seems likely enough that more than a few others have come and gone unobserved, even in recent years.— Nathan Clifford Brown, *Portland, Maine.*

[1] Bull. Nutt. Orn. Club, V, pp. 236–237; Auk, XIII, pp. 264–265.

RECENT LITERATURE.

Barrows' Michigan Bird Life.[1]— A comparison of Cook's 'Birds of Michigan' published by the Michigan Agricultural Experiment Station in 1893 and the present special bulletin of the state Agricultural College, furnishes a good illustration of the important position that the study and preservation of our native birds have attained during the past two decades. Where twenty years ago a pamphlet of 148 pages fulfilled the demand, the state today feels fully justified in the issue of this portly volume of 822 pages with 70 plates and 152 figures.

Prof. Barrows is to be congratulated upon the manner in which he has assembled his materials, and in his happy treatment of the subjects discussed in the introduction, especially 'migration' and 'how to study birds.' We heartily agree with him too when he says "The great importance of wild birds to the agriculturist may be readily conceded. Nevertheless it seems very desirable, at this time, that we should recognize the fact that all the wild things of our country, birds, mammals, insects, plants, have a right to protection, preservation, recognition, entirely apart from their *economic* status, using that word to indicate merely the amount of good or harm in dollars and cents which can be attributed to them. The fox, the Crow, the Kingfisher, the muskrat, may or may not, in the long run, be 'more beneficial than harmful,' yet each in its own way has a scientific, an æsthetic, a human value, which cannot be estimated in dollars and cents and which should forever protect him from extreme persecution, and above all from final extinction."

Our author's attitude toward collecting specimens moreover seems admirably expressed. While he believes in careful restriction in the granting of permits he says: "A moment's thought will convince anyone that the student who searches the woods carefully for a bird which he has never seen, who follows up each unknown call or song, watches with care each doubtful and illusive form which suggests the bird desired, and finally, perhaps after hundreds of disappointments, kills a specimen of the much coveted species and measures, preserves and labels it, has gained a knowledge of the appearance, habits, notes, size and structure of this species which could be obtained in no other possible way. Not only has he gained

---

[1] Michigan Bird Life | A List of all the Bird Species known to occur on the State together with | an outline of their Classification and an account of the | Life History of Each Species, with special reference to its | Relation to Agriculture. With Seventy Full-page Plates | and One Hundred and Fifty-two Text Figures | By | Walter Bradford Barrows, S. B., | Professor of Zoölogy and Physiology and | Curator of the General Museum | Special Bulletin | of the | Department of Zoölogy and Physiology | of the | Michigan Agricultural College | Published by the Michigan Agricultural College | 1912 — 8vo. pp. 822, 70 plates 152 text figures — Sold at the College. 45 cts. paper, 60 cts. cloth; transportation 35 cts. extra, must be prepaid.

all this knowledge with regard to the particular specimen, but in doing so he has exercised, consciously or unconsciously, his powers of observation, comparison and discrimination with regard to scores of other birds, so that his experience has been broadened and his power and judgment very materially strengthened."

The main text of Prof. Barrows work follows the nomenclature of the new A. O. U. Check-List. After the name comes a paragraph of popular synonyms and such technical synonyms as are used in the standard works; then follows a brief summary of the more striking characters by which the species may be recognized; an outline of its general distribution; a discussion of its occurrence in Michigan, its habits, nesting, etc., often at considerable length; and finally, a technical description. Much valuable economic and historic matter is incorporated in the articles the object being to select 'such information as would be useful and interesting.' Of Cook's 336 species 30 have been relegated to the hypothetical list while 20 others have been added making a total of 326 positively identified within the limits of the state.

Each family is preceded by a key for use with the specimen in hand, while six appendices treat respectively of, Additions and Corrections, Hypothetical List, Bibliography, Glossary, Outline of Classification of North American Birds (families and orders), and List of Contributors.

The value of the bibliography is materially lessened by the fact that the titles of each author are printed continuously, in one paragraph with title, reference date, etc., all in the same style of type which makes it exceedingly difficult to consult. The general typography and appearance of the work are excellent and the half tones and line cuts which are drawn from various sources, some of them original, are usually well printed.

Prof. Barrows has evidently had the cordial support of all Michigan ornithologists and bird lovers in his task and the result is one of which the state and the author may well be proud.— W. S.

Willett's Birds of the Pacific Slope of Southern California.[1]— In this recent publication of the Cooper Ornithological Club forming number 7 of the Pacific Coast Avifauna series, Mr. Willett presents a carefully prepared annotated list of the birds of 'the Pacific slope of southern California from, and including Santa Barbara County, to the Mexican line and from the summit of the mountains to the ocean, also including all the islands of the Santa Barbara group.' The work was originally intended as a revision of Grinnell's 'Birds of the Pacific Slope of Los Angeles County' published in 1898, but it was later thought better to extend its scope to the above limits.

The style and typography of the work are excellent and conform to other numbers of the same series. In nomenclature the author follows the

[1] Pacific Coast Avifauna, Number 7. Birds of the Pacific Slope of Southern California. By George Willett, Cooper Ornithological Club. Hollywood, California. Published by the Club. July 25, 1912 — 8vo., pp. 1–122.

latest edition of the A. O. U. Check-List discussing in detail his reasons for differing from the A. O. U. Committee in the distribution of several species. We note the following cases where Mr. Willett's evidence leads him to differ with the statements of the Check-List.

Brachyramphus marmoratus is stated in the Check-List to range south to San Diego in winter but Mr. Willett can find no record south of Santa Barbara.

Branta canadensis occidentalis is credited with ranging to southern California in winter but there seems to be no record for the region covered by the present paper.

Oreortyx picta plumifera is considered by Mr. Willett, to include all southern California birds. Those from the San Gabriel and San Bernardino Mountains are referred to *O. p. confinis* in the Check-List but Messrs. Grinnell and Swarth after careful study of the matter would refer all to *plumifera*.

Following the opinion of Messrs. Ridgway and Oberholser he excludes *Empidonax griseus* from California referring the birds so called to *E. wrighti*.

Aphelocoma californica obscura is also excluded from California, the birds breeding from Los Angeles to San Bernardino which are referred to this form in the Check-List, proving to be, in the opinion of Messrs. Grinnell and Swarth, referable to *A. c. californica*.

Careful local studies of this kind are just what are needed to straighten out the details in the distribution of our birds, and Mr. Willett's contribution is most welcome.

We note but few typographical or other errors, but since the author invites corrections we may mention that the Avocets noted by Dr. Newberry (p. 35) were in the winter of 1855 not 1885 and the Audubon reference on p. 71 should be to the Ornithological Biography not the Elephant Folio. We might also call attention to an earlier publication of Evermann's 'Birds observed in Ventura County, Cal.' which appeared in Vol. 1, No. 8 (Jan. 1886), pp. 77–89, of the *Pacific Science Monthly*, a small journal edited by Stephen Bowers, Ph.D., and published at San Buenaventura, Cal., apparently as the organ of the Ventura Society of Natural History.

This title does not appear in Grinnell's Bibliography of California Ornithology. Except as to nomenclature the paper is essentially the same as that in 'The Auk' for 1886. *Polioptila melanura* however, is included (erroneously) as a rare resident.— W. S.

Mathews' Birds of Australia.[1] — Three parts of this monumental work have been received since the last notice in 'The Auk.' Part 6 of Volume I, bearing date, January 31, 1912, consists of title page, contents, preface and index of the first volume, while Part 1 of Volume II, May 30, 1912, and Part 2 of Volume II, July 31, 1912, comprising 236 pages and 27 plates are devoted to the Petrels.

[1] The Birds of Australia. By Gregory M. Mathews. With hand-coloured Plates. Roy. 4to. Witherby and Co., London.

The high standard set in Volume I is maintained in the parts before us, both plates and letter press being beautifully executed, while the history, synonymy and relationship of the various species are treated at length. As Mr. Mathews states in the preface to Volume I, the accounts of the life history of some species are necessarily meagre on account of the lack of reliable information; a condition that is familiar to compilers of life histories of birds in other countries as well as Australia, and one that should be constantly remembered by field ornithologists. Mr. Mathews' work may leave little to be said on the systematic side of Australian ornithology but the members of the Royal Australasian Ornithologists' Union will still have a wide field open to them in completing the accounts of the life and habits of their birds.

The recently rediscovered Solander manuscripts are reprinted as well as other matter relative to the early descriptions and discoveries of Petrels, and as is usual in the author's investigations he finds quite a number of races which he regards as separable, many of them from outside of Australian waters.

We note the following new forms described in the parts now before us. In part 1: *Oceanites oceanicus exasperatus*, New Zealand Seas; *Oceanites nereis couesi*, Kerguelen Isl.; *O. n. chubbi*, Falkland Isl.; *Pelagodroma marina dulciæ*, W. Australia; *P. m. maoriana*, Chatham and Aukland Isls.; *P. m. howei*, E. Australia; *Fregetta tubulata*, 'Gould' ms., Australian coast; *Puffinus couesi*, Californian coast; *P. assimilis kempi*, Chatham Isls.; *P. a. tunneyi*, W. Australian, *P. lherminieri boydi*, Cape Verde Isls.; *P. l. becki*, Culpepper and Wenman Isls., Galapagos; *P. l. nugax*, 'Solander' ms., Queensland; *Puffinus reinholdi*, New Zealand; *P. r. huttoni*, Snares Isl., N. Z. *P. pacificus hamiltoni*, Seychelles; *P. p. alleni*, San Benedicto Coast of California; *P. p. laysani*, Laysan; *P. p. royanus*, E. Australia; *P. carneipes hullianus*, Norfolk Isl.; *P. c. hakodate*, Japan; *P. c. carbonarius* 'Solander' ms.; *Procellaria æquinoctialis mixta*, Cape Seas; *P. a. steadi*, New Zealand; *P. a. brabournei*, West Coast, S. A. In part 2: *Pagodroma confusa*, Cape Adare, Victoria Land; *Macronectes giganteus solanderi*, Falkland Isls.; *M. g. halli*, Kerguelen Isl.; *M. g. wilsoni*, Ross Sea; *M. g. forsteri*, west coast of South America; *Prion vittatus keyteli*, Tristan d'Acunha, *P. v. gouldi*, Bass Strait; *P. v. macgillivrayi*, St. Paul's, Indian Ocean; *P. v. missus*, W. Australia; *Pseudoprion turtur eatoni*, Kerguelen; *P. t. solanderi*, west coast South America; *P. t. huttoni*, Chatham Isls.; *P. t. crassirostris*, Bounty Isls.; *Heteroprion belcheri*, coast of Victoria; *H. desolatus mattingleyi*, E. Australian Seas; *H. d. perrugneyi*, Cape Seas; *H. d. macquariensis*, Macquairie Isl.; *H. d. alter*, Auckland Isls. Three new genera are proposed as follows *Fregettornis*, type *Fregetta grallaria*; *Nesofregetta*, type *F. mæstissima*; *Heteroprion*, type *H. belcheri*.

Mr. Mathews points out that *Fregetta leucogaster* Gould should replace *F. grallaria* Vieill. in the A. O. U. Check-List, the two being separable and the latter restricted to Australian waters. *Puffinus auricularis* Towns. he regards as identical with *P. opisthomelas* Coues, while the bird generally

so called is renamed *P. couesi*. *P. griseus* is again subdivided, our Atlantic form being *P. g. stricklandi*, while our Pacific form is *P. g. chilensis*. Taken altogether these parts of Mr. Mathews' work constitute one of the most important contributions to our knowledge of the Procellariiformes that has yet appeared.— W. S.

The Austral Avian Record No. 3.[1]— In this number Mr. Mathews discusses the coloration of the head and neck of the Australian Cassowary and some rare publications by S. Diggles on new Australian birds. Another list of additions and corrections to the author's 'Reference List' of the birds of Australia also appears containing twenty-two additional new subspecies. — W. S.

Bryant on The Present and Future Status of the California Valley Quail.[2]— The investigation reported in this paper shows conclusively that the preservation of this well known game bird is likely to be seriously threatened if present conditions in California continue. The increase in gunners, extension of agriculture and destruction of cover are shown to be the most serious factors.

The issue of 12,500 hunting licenses in southern California in 1910, and the merciless slaughter of Quail by market gunners and others in the past, clearly show where lies the responsibility for the decrease in numbers that Mr. Bryant has reported. All aspects of the question are carefully considered and steps for the furnishing of food and cover, and for limiting the amount of hunting, so that the annual destruction does not exceed the production of young, are recommended.— W. S.

Grinnell's Systematic List of the Birds of California.[3]—The object of this publication seems to be to present a list of Californian Birds in a sequence which the author regards as representing the most modern ideas of classification — *i. e.* as presented in Knowlton's 'Birds of the World.' As in Mr. Grinnell's previous catalogue, many races described by him but not recognized in the A. O. U. Check-List are included. Useful as the list is in illustrating a modern system of classification it is to be hoped, as a matter of convenience to all American Ornithologists, that it be not followed in future publications of the Cooper Ornithological Club. In faunal lists matters of classification are of secondary importance as compared with the great convenience of uniformity of sequence. Mr. Grinnell's list enumerates 530 species and subspecies, 55 of which are regarded as of casual or accidental occurrence.— W. S.

---

[1] The Austral Avian Record, Vol. I, No. 3. Witherby & Co., London. June 28, 1912.

[2] The Present and Future Status of the California Valley Quail. By Harold C. Bryant. The Condor, Vol. XIV, July, 1912, pp. 131–142.

[3] A Systematic List of the Birds of California. Pacific Coast Avifauna, No. 8, Cooper Ornithological Club, Hollywood, Cal. August 30, 1912. pp. 1–23.

Chapman on New Colombian Birds.[1]— Mr. Chapman in this paper, which is preliminary to a detailed one now in preparation, presents the first report on the results of the ornithological investigations of the American Museum expedition to Colombia, which was planned and directed by him, and with which he was personally associated from March to June, 1911. This contribution consists of a brief outline of the personnel and itinerary of the expedition to date, with a map and diagnoses of 40 new species and subspecies of birds.

While most of these are from the Cauca region, the Paramo of Santa Isabel and other parts of western Colombia others are from Santa Marta, and one, *Synallaxis gularis cinereiventris*, from Merada, Venezuela. The distinctness of these latter forms was brought out by a study of the Cauca material. The interest which attaches to this paper will make all students of the Neotropical avifauna eager for the appearance of Mr. Chapman's detailed report.— W. S.

Chapman on a New Ibis from Mt. Kenia.[2]— Mr. and Mrs. C. E. Akeley have presented to the American Museum a pair of Ibises with their nest, a portion of an egg-shell, and three young, which they collected on Mt. Kenia, British East Africa, in September, 1910. Mr. Chapman finds that the specimens represent not only a new species but a new generic type, most nearly related to *Hagedashia* but resembling in some respects *Lophotibis* and *Lampribis*. He has named the species *Oreoibis akleyorum*.— W. S.

Richmond on New Birds from the West Coast of Sumatra.[3]— The collections made by Dr. W. L. Abbott in 1903 and 1904 on islands off the west coast of Sumatra, and presented to the United States National Museum, have yielded the following new forms which are here named and described by Dr. C. W. Richmond. *Muscadivores consobrina babiensis*, Pulo Babi; *Thriponax javensis buttikoferi*, Nias Island; *Dicæum sumatranum batuense*, Batu; *Alcedo meninting proxima*, North Pagi; *Copsychus saularis pagiensis*, North Pagi.— W. S.

Beebe on New Blood Pheasants.[4]— Mr. Beebe's study of the specimens of Pheasants obtained on the Kuser-Beebe Expedition has brought to light the existence of two undescribed forms of Blood Pheasant which are here

---

[1] Diagnoses of apparently new Colombian Birds. By Frank M. Chapman. Bulletin Amer. Mus. Nat. Hist., XXXI, Art. XVI, pp. 139–166. July 23, 1912.

[2] A New Ibis from Mt. Kenia, British East Africa. By Frank M. Chapman. Bulletin Amer. Mus. Nat. Hist., Vol. XXXI, Art. XXI, pp. 235–238. August 6, 1912.

[3] Descriptions of Five New Birds from the West Coast of Sumatra. By Charles W. Richmond. Proc. Biol. Soc. of Washington. Vol. XXV, pp. 103–106, June 15 [= 14], 1912.

[4] New Blood Pheasants. By C. William Beebe. Zoologica, Scientific Contributions of the New York Zoological Society, Vol. 1, No. 10, pp. 189–193. Aug. 17, 1912.

discussed in detail and named. *Ithaginis kuseri* is from northwestern Yunnan, while *I. cruentus affinis* is proposed for the bird of southern Sikkim, as contrasted with *I. cruentus cruentus* of Nepal and northern Sikkim.— W. S.

Oliver on The Geographic Relationships of the Birds of Lord Howe, Norfolk, and the Kermadec Islands.[1] — In this interesting paper Mr. Oliver discusses the relationship of the avifauna of these three islands. His conclusions are that their affinity is clearly with New Zealand rather than with Australia, while the New Caledonian element that is present leads him to endorse the theory of a land bridge between the latter island and New Zealand, of which Lord Howe was a part and Norfolk Island but slightly separated. These two islands he would regard as forming one province of the New Zealand region while the Kermadecs he thinks should form a separate province, whose fauna is derived wholly from transoceanic migration, without any of the wingless Rails or other species of Lord Howe Island which apparently date from the time of the land bridge. Mr. Oliver cites examples outside of the avifauna in support of his views but it would be interesting to see how a detailed study of other groups of animals or plants would agree with them.— W. S.

Gladstone's The Vertebrate Fauna of Dumfriesshire.[2] — Mr. Gladstone's beautifully printed little book furnishes us with an annotated list of the vertebrates of his native county, which while largely of local interest is also a valuable work of reference for anyone interested in Scottish zoölogy. The birds number 224 species with 39 others reported on unsatisfactory evidence. An introduction dealing with the physical features of the region under consideration and a map, are valuable adjuncts to the Catalogue.— W. S.

Horsbrugh and Davies on The Game-Birds and Water-Fowl of South Africa.[3] — Part 2 of this attractive work is quite up to the standard of the first number already noticed in 'The Auk.' It includes plates and text of fourteen species of Francolin and three Quail — 2 *Coturnix*, 1. *Excalfactoria* — and one Button Quail, *Turnix*. The account of the breeding of the last species, the male of which incubates the eggs and cares for the young, is especially interesting.— W. S.

---

[1] Geographic Relationships of the Birds of Lord Howe, Norfolk and the Kermadec Islands. By W. R. B. Oliver. Trans. New Zealand Inst., Vol. XLIV, 1911, pp. 214–221. June 10, 1912.

[2] A Catalogue | of | The Vertebrate Fauna | of | Dumfriesshire | by | Hugh S. Gladstone | M. A., F. R. S. E., F. Z. S., M. B. O. U. | Author of "The Birds of Dumfriesshire" | J. Maxwell & Son | Dumfries | 1912.

[3] The Game-Birds and Water-Fowl of South Africa by Major Boyd Horsbrugh, with coloured plates by Sergeant C. G. Davies. Part 2. London, Witherby & Co. July 2nd, 1912.

The Ornithological Journals.

Bird Lore. Vol. XIV, No. 4. July–August, 1912.

A list of Trees, Shrubs, Vines and Herbaceous Plants Native to New England, Bearing Fruit or Seeds Attractive to Birds. By F. H. Kennard.

Observations in a Laughing Gull Colony. By Francis Harper — At Cobbs Island, Va.

Some Nesting Habits of the Oregon Junco. By May R. Thayer.

Red-headed Woodpecker at Camden, N. J. By Julian K. Potter.

The Yellow-headed Blackbird. By Thomas S. Roberts. Educational Leaflet No. 57.

The Condor. Vol. XIV, No. 4. July–August, 1912.

Birds of the Cottonwood Groves [New Mexico]. By Florence Merriam Bailey.

Notes on the Wading Birds of the Barr Lake Region, Colorado. By Robert B. Rockwell. — With excellent photographs of nests.

Present and Future Status of the California Valley Quail. By H. C. Bryant.

A Journey to the Star Lake Country and other Notes from the Tahoe Region. By Milton C. Ray.

The Present Status of the Colorado Check-List of Birds. By W. W. Cooke.— A discussion of the species added by W. L. Sclater in his 'History of the Birds of Colorado' and those rejected by him.

Prof. Cooke considers that seven species should be rejected from Sclater's list while fifteen should be added upon the evidence here presented, making the total number of species for the state 403.

The Wilson Bulletin. No. 79. June, 1912.

A Study of the Home Life of the Brown Thrasher, *Toxostoma rufum*. By Ira N. Gabrielson.— The four young were tagged for identification and 775 feedings by the parents were recorded as to time, nature of food, and individual fed, and sex of parent. The results are tabulated in various ways and yield valuable results.

A Study of the Avifauna of the Lake Erie Islands (continued). By Lynds Jones.

The Oologist. Vol. XXIX, No. 6. June 15, 1912.

The Bewick's Wren [in southwestern Pennsylvania]. By S. S. Dickey

The Oologist. Vol. XXIX, No. 7. July 15, 1912.

Nesting of the Virginia and Sora Rails in Pennsylvania. By R. C. Harlow.

The Oologist. Vol. XXIX. No. 8. August 15, 1912.

The American Bittern [about Buffalo, N. Y.] By Ottomar Reinecke.

Breeding Birds of Marshall Co., Ill. By R. M. Barnes.

The Ibis. IX Series. Vol. VI, No. 23. July, 1912.

On the Birds of Ngamiland. By W. R. Ogilvie-Grant. With Itinerary and Field-notes by R. B. Woosnam.— An interesting account of a journey across the Kalahari desert to the Okavango marshes, Bechuanaland. The

collection of birds was by no means complete but 92 species are listed, of which five are new *Cisticola kalahariæ, Bradypteris bedfordi, Certhilauda kalahariæ, Trachyphonus nobilis* and *Pycnonotus tricolor ngamii.*

Contributions to the Ornithology of Egypt. No. III. The Birds of the Wadi Natron. By M. J. Nicoll.— This paper covers the ornithology of a chain of salt lakes situated northwest of Cairo, 171 species are listed.

Bird-notes in two Andalusian Sierras. By Captain H. Lynes.— A discussion of the life zones of some of the mountainous parts of Spain — San Cristobal and Sierra Nevada — with a list of 82 species.

Observations on the genus *Cœreba*, together with an Annotated List of the Species. By Percy R. Lowe.— An exceedingly interesting Monograph with a correlation of the distribution of the species with geological history. Two main color types exist, corresponding quite well with the mid-tertiary land areas. That covering the Central American and Andean region has extended by a probable ancient land bridge to Jamaica, Haiti and Porto Rica, while the species of the Lesser Antilles belong to the Brazilian type, these islands having been probably formerly connected with the eastern coast region of Venezuela. 800 specimens were examined and 34 species and subspecies are recognized, *C. chloropyga cayennensis*, Cayenne, and *C. luteola montana*, Merida, Venezuela, are described as new.

Bulletin of the British Ornithologists' Club, CLXXIX.

Messrs. Wallis and Pearson describe the nesting of two Algerian Larks, *Rhamphocorys clot-bey* and *Ammomanes deserti algeriensis* and the Mediterranean Gallinule, *Porphyrio cæruleus.*

Mr. Ogilvie-Grant reports that Mr. Walter Goodfellow who has been exploring Mount Arizan, Formosa, had successfully brought to the coast living specimens of the splendid Mikado Pheasant, *Calophasis mikado.* He also describes the following new birds from Mr. Goodfellow's collection: *Horeites acanthizoides concolor, Brachypteryx goodfellowi, Parus ater ptilosus,* and *Dicæum formosum.*

Bulletin of the British Ornithologists' Club, CLXXX.

Mr. Ogilvie-Grant shows the distinctness of the three African Francolins, *Francolinus castaneicollis, F. bottegi* and *F. gofanus.*

Mr. Thomas Parkin records a specimen of *Terekia cinerea* from Kent, a new bird for Great Britain.

Dr. Percy R. Lowe's new race of the Lesser Black-backed Gull, *Larus fuscus brittanicus*, is discussed at length.

Mr. H. J. Elwes describes briefly his recent journey to Formosa. The following new birds are described, *Erythrocercus nyasæ* Olgivie-Grant, Nyassaland: and *Scops spurrelli* Ogilvie-Grant, Ashanti.

Appended to this number is a paper on the birds of the Island of Shaweishan by J. D. La Touche revised by C. B. Rickett. This investigation was financed by the Ornithologists' Club for the purpose of obtaining information on the migration of birds on the Chinese coast. 193 species are listed.

The Avicultural Magazine. Vol. III, No. 8. June, 1912.

Notes on Sexual Selection. By Frank Finn (concluded in July number).

Diary of Birds seen on the White Nile (concluded). By Richard Staples-Browne.

Wintering Cranes in New England. By J. C. Phillips.

British Birds. Vol. VI, No. 1. June 1, 1912.

The Lesser Black-backed Gull of the British Isles. *Larus fuscus brittanicus* subsp. nov. By Percy R. Lowe.

Tengmalm's Owl captured in Northumberland. Its Behaviour in Captivity. By J. M. Charlton.

British Birds. Vol. VI, No. 2. July 1, 1912.

Robert Sibbald and his Prodromus. By W. H. Mullens.— Extracts and plates from this curious old work.

British Birds. Vol. VI, No. 3. August 1, 1912.

The Terek Sandpiper in Kent. A New British Bird. By Thomas Parkin.

Bird Notes. June and July, 1912.

Birds of Gambia. By E. Hopkinson (continued in both numbers). Colored plate of *Chloropsis aurifrons* in July.

The Emu. XII, Pt. 1. July, 1912.

Field Ornithology in South Australia — By Capt. S. A. White.— Account of a collecting trip to the Eyre pennisula with field notes on many species.

Examination of Contents of Stomachs and Crops of Australian Birds — by J. Burton Cleland.— 105 stomachs of 53 species.

New Birds for Australia. By A. J. Campbell (published separately, May 21, 1912).— New species are *Ptilonorhynchus minor*, Heberton Range; *Ptilotis carpentariensis* Burketown, Gulf of Carpentaria; *Ptilotis subchrysops*, Northern Queensland.

Lilac nape-band on Female Bower-Birds (*Chlamydodera*). By H. L. White — shown to occur on some females beyond question.

Descriptions of eggs of *Ptilonorhynchus minor* and *Ninox strenua*. By H. L. White.

Metallic Starlings (*Calornis*). By E. J. Banfield.— Observations on nesting and habits.

Breeding Habits of White Tern (*Gygis alba*) of the Kermadec Group. By R. S. Bell.— An exceedingly interesting account with photographs showing the egg and young. The egg is always deposited on a limb or leaning trunk of the Pohutukawa tree (*Metrosideros villosus*) on flat or slightly hollowed places in the bark. There is no nest structure whatever.

Oologists in the Mallee. By F. Erasmus Wilson.— Notes on 79 species with several excellent photographs of nests and birds.

Kangaroo Island Reserve.— B. J. W. Mellor.— Urges the enlargement of the small area now protected by the government.

Bird Life near Home. By Thos. P. Austin.

Forgotten Feathers.— Lewin's Birds of New Holland, 1808. By Gregory M. Mathews.

Journal of the South African Ornithologists' Union. VIII, No. 1. June, 1912.

On some Birds in the Durban Museum. By E. C. Chubb.

Notes on the Migratory Birds of the Buffalo River Basin. By Rev. Robt. Godfrey.

Field-Notes on Birds collected at Blaauberg, N. Transvaal. By F. O. Noome.

Description of a New Flycatcher. By Austin Roberts.— *Tarsiger stellatus transvaalensis*, subsp. nov., Woodbush, Transvaal.

Notes on a Collection of Birds in the Transvaal Museum from Boror, Portuguese East Africa. Part II. By Austin Roberts.— *Petronia superciliaris bororensis*, *Pycnonotus layardi pallidus* and *Cisticola rufica-pilla bororensis*, subspp. nov.

Ornithologische Monatsberichte. June, 1912.

On the Song of Birds. By Fritz Braun.

On *Crateropus caudatus altirostris* Hart. By N. Sarudny — Regards it as a synonym of *C. c. salvadorii* De Filippi.

Turdus viscivorus loudoni nom. nov. By N. Sarudny For. *T. v. sarudnyi* Loudon.

Behavior of birds during the Solar eclipse of April 17, 1912. By Dr. B. Ottow.

Description of a new Woodpecker from Colombia. By Dr. J. von Madarasz. *Chrysoptilus ujhelyii* from Aracataca.

Do young birds require the instruction of their parents? By Dr. J. Gengler.

Lagopus lagopus brevirostris subsp. nov. By Dr. E. Hesse.— From Altai.

Pitta habenichti Finsch., n. sp. New Guinea. *Cf.* also article in the following number.

Ornithologische Monatsberichte. July–August, 1912.

Remarks on A. Voigt's Problems of Interpretation of Bird Notes. By Fritz Braun.

Remarks on the Crested Larks of Suez, Sinai and Palistine. By Paul Kollibay.

On the nest of *Tachornis parvus myochrous* in Dutch East Africa. By Ludwig Schuster.

Iynx thorbeckei Rchw. n. sp. Kamerun.

Journal für Ornithologie. July, 1912.

Report on Bird Migration observations for 1911. By Dr. J. Thienemann.

From Suez to St. Katherine's Monastery (Sinai). By O. Graf Zedlitz.— An annotated list of 59 species (to be continued).

Ornithology of N. W. Mesopotamia and Interior Syria (continued). By Dr. H. Weigold.

On the nuptial flight and call notes of the Marsh Hawks and Short-eared Owl. By Dr. E. Hesse.

Ornithologisches Jahrbuch. XXIII. Nos. 3–4. May–August, 1912.

The Geographic Races of *Chloris chloris*. By A. Laubmann.— Seven are recognized.

The Forms of *Emberiza citrinella* L. 1758. By Dr. J. Gengler.— Four recognized.

On the Birds of the Island of Arbe (North Dalmatia). By Dr. G. Schiebel.

Several Reports on the invasion of Nutcrackers in the winter of 1911.

A review of Rob. Ritter v. Dornbrowski's Ornis Romaniæ. Contains remarks on the nature of certain new species here proposed.

Ornithologische Monatsschrift. Vol. 37, No. 6–7.

No. 6 contains an article on Light-houses and Bird Protection. By Dr. Carl R. Henniche.

No. 7. Ornithological Observations on the island of Œsel (on the west coast of Russia). By Leon Freih. von Campenhausen.

Revue Francaise d'Ornithologie. IV, No. 39. July, 1912.

Ornithological Notes from Tunis (continued in No. 40). By Dr. Millet-Horsin.

Wintering of Indigenous and Exotic Birds in the Open Air. By A. René Bacon.

Revue Francaise d'Ornithologie. IV, No. 40. August, 1912.

The Harvest of the Ostrich Plumes.— A refutation of certain charges of cruelty.

Persistence of the Instinct of the Wild Duck in Captivity.— V. Meilheurat.

Ornithological Articles in other Journals.

Dewar, J. M. The Evolutions of Waders. (The Zoölogist, No. 851. May 15, 1912).— Discussion of the wheeling etc. of flocks of Shore-birds and their probable explanation.

Selous, E. Domestic Habits of the Red-throated Diver (concluded). (The Zoölogist, No. 852. June 15, 1912).

Harvie-Brown, J. A. Habits of the Whimbrel (*Numenius phæopus*). (The Zoölogist, No. 853. July 15, 1912).

Stubbs, F. J. Notes on the Habits and Coloration of the Common Starling (*Sturnus vulgaris*). (The Zoölogist, No. 854. August, 1912). — Discusses metallic colors of feathers.

Ingram, C. On the Furze Warblers of France. (The Zoölogist, No. 854. August, 1912).— *Sylvia undata aremoricus* de Palluel, a valid race.

Harvie-Brown, J. A. The Fulmar: Its Past and Present Distribution as a Breeding Species in the British Isles. (The Scottish Naturalist. June, 1912).— A detailed discussion, with an excellent map.

Thomson, A. L. Aberdeen University Bird Migration Inquiry: First Interim Report (1909–12). (The Scottish Naturalist, June and July, 1912).— A report on reappearances of ringed birds,— 56 cases are listed in these two installments.

Seth-Smith, David. On the Moulting of the King Penguin (*Aptenodytes pennanti*) in the Society's Gardens (Proc. Zool. Soc. London, 1912, pp. 60–62). Illustrated by photographs.

Crandall, Lee S. The Carolina Parrakeet. (N. Y. Zool. Society Bulletin, No. 49, Jan., 1912).— Eleven specimens known to be living in Zoölogical Gardens.

Beebe, C. Wm. and Burtch, Verdi. Storm Bound Ducks. (N. Y. Zool. Society Bulletin, No. 51, May, 1912). On Lake Kenka. cf. also editorial in same number on The Tragedy of the Grebes dealing with the freezing of the New York lakes.

Publications Received.— Barrows, Walter B. Michigan Bird Life Published by the Michigan Agricultural College. 1912.

Beebe, C. William. New Blood Pheasants. Zoölogica. Scientific Contributions of the New York Zoölogical Society, Vol. 1, No. 10. August 17, 1912. pp. 189–193.

Bryant, Harold C. The Present and Future Status of the California Valley Quail. (The Condor, XIV, 1912, pp. 131–142).

Chapman, Frank M. Diagnoses of apparently new Colombian Birds. (Bull. Amer. Mus. Nat. Hist., XXXI, pp. 139–166. July 23, 1912).

Chapman, Frank M. A new Ibis from Mt. Kenia, British East Africa. (Bull. Amer. Mus. Nat. Hist., XXXI, pp. 235–238. August 6, 1912).

Gladstone, Hugh S. A Catalogue of The Vertebrate Fauna of Dumfriesshire. J. Maxwell & Son, Dumfries, 1912.

Grinnell, Joseph. A systematic List of the Birds of California. Pacific Coast Avifauna No. 8. Cooper Ornithological Club, Hollywood, California. August 30, 1912.

Horsbrugh, Major Boyd. The Game-Birds and Water Fowl of South Africa, with colored plates by Sergeant C. G. Davies. Part 2. London. Witherby & Co. July 2, 1912.

Mathews, Gregory M. The Birds of Australia. Vol. II. Pt. 2. London. Witherby & Co. July 31, 1912.

Miller, M. De W. A Revision of the Classification of the Kingfishers. (Bull. Amer. Mus. Nat. Hist., XXXI, pp. 239–311. September 12, 1912.)

Oberholser, Harry C. A Revision of the Subspecies of the Green Heron (*Butorides virescens* [Linnæus]) (Proc. U. S. Nat. Mus., 42, pp. 529–577. August 29, 1912).

Oliver, W. R. B. Geographic Relationships of the Birds of Lord Howe, Norfolk and the Kermadec Islands. (Trans. New Zealand Institute XLIV, 1911, pp. 214–221. June 10, 1912.)

Palmer, T. S., Brewster, C. E., and Earnshaw, F. L. Game Laws for 1912. U. S. Dept. of Agriculture, Farmer's Bull. 510.

Palmer, T. S. Directory of Officials and Organizations concerned with

the Protection of Birds and Game, 1912. Circular 88, U. S. Dept. of Agriculture.

Richmond, Charles W. Descriptions of five New Birds from the West Coast of Sumatra. (Proc. Biol. Soc. of Washington, XXV, pp. 103–106. June 15 (= 14) 1912.)

Warren, Edward R. Some North-central Colorado Bird Notes. (The Condor, XIV, 1912, pp. 81–104.)

Willett, George. Birds of the Pacific Slope of Southern California. Pacific coast Avifauna No. 7. Cooper Ornithological Club, Hollywood, Cal. July 25, 1912.

Shufeldt, R. W. American Ducks and How to Distinguish them. Pts. V–VII. (Outer's Book, July–Sept., 1912).

Thayer, Abbott H., Concealing Coloration, an answer to Theodore Roosevelt. (Bull. Amer. Mus. Nat. Hist., XXXI, pp. 313–321, September 14, 1912.)

Abstract Proc. Zool. Soc. London, No. 111. June 4, 1912.

Ardea, I, No. 2. July, 1912.

Austral Avian Record, I, No. 3, June 28, 1912.

Avicultural Magazine (3) III, Nos. 8–11, June–September, 1912.

Bird-Lore, XIV, No. 4, July–August, 1912.

British Birds, VI, Nos. 1–4, June–September, 1912.

Bulletin, British Ornith. Club, No. CLXXVIII–CLXXX and Index to Vol. XXIX, April–June, 1912.

Condor, The, XIV, No. 4, July–August, 1912.

Emu, The, XII, Pt. 1, July, 1912.

Forest and Stream, LXXVIII, No. 26, LXXIX, Nos. 1–12.

Ibis, The, (9) VI, No. 23, July, 1912.

Oölogist, The, XXIX, Nos. 6–9, June–September, 1912.

Ornithologisches Jahrbuch, XXIII, Nos. 3–4, May–August, 1912.

Ornithologische Monatsschrift, 37, Nos. 6–8, June–August, 1912.

Ottawa Naturalist, The, XXVI, Nos. 3–4, June–July, 1912.

Proceedings California Acd. of Sciences, (4) I, pp. 289–430, III, 147–160, III, 183–186.

Proceedings and Transactions, Nova Scotia Inst. of Science, XIII, Pt. 1, June 26, 1912.

Records of the Australian Museum, VIII, No. 3, May 6, 1912; IX, No. 1, April 26, 1912.

Revue Française d'Ornithologie, IV, Nos. 39–40, July–August, 1912.

Science, N. S., XXXV, No. 913; XXXVI, Nos. 914–925.

Scottish Naturalist, The, 1912, Nos. 6–9, June–September, 1912.

West Virginia Fish and Game Protective Association, Report of Fifth Annual Meeting.

Wilson Bulletin, The, XXIV, No. 2, June 1912.

Verhandlungen der Ornithologischen Gesellschaft in Bayern XI, Heft. 2, July 1, 1912.

Zoölogist, The, (4) XVI, Nos. 186–188, June–August, 1912.

CORRESPONDENCE.

The Functions of the A. O. U. Committee on Nomenclature.

EDITOR OF 'THE AUK':

Dear Sir: The appearance, in your July issue, of the Sixteenth Supplement to the A. O. U. Check-List, and of comments in your 'Notes and News' column relative to the uses of the A. O. U. Committee, prompt me to give expression to some ideas which have doubtless occurred independently to not a few lay students of North American birds.

If I infer correctly, the comments in question were written by a member of the Committee; hence they are in a measure an avowal of purpose, and to a degree authoritative. From these comments, and from the recent output of the Committee, we may safely adduce the following as being the main, if not all of, the functions of the Committee.

(1) To decide upon a system of groupings, that is, upon what genera and higher groups are to be recognized, and upon the sequence of these and the contained species. (2) To decide upon cases of nomenclature, where from various contingencies the correct name of the species may be in more or less doubt. (3) To determine the boundaries of 'North America,' and to pass upon the claims for inclusion in the North American list, of various vagrant species, so rare that the evidence of occurrence must be examined and weighed. (4) To decide as to the merits of the various finely differentiated subspecies which are being named by systematic students, both as to the validity of the characters assigned, and as to whether the degree of difference is sufficiently well marked to warrant recognition in the official Check-List.

The great value of a committee of arbitration in the first three of these functions is beyond any possibility of dispute. The personnel of the Committee as now constituted is of that high grade of judicial ability and long experience which brings confidence in their rulings in these respects. For these functions alone the existence of such a committee is fully warranted. The chief complaint that I can seriously offer in these regards is that in the recent Third Edition of the Check-List the matter of presenting a modern system of classification was shirked altogether, on the plea (flimsy, was it not?) that some inconvenience would result! This was a grievous error, which every bona fide student of ornithology deplores.

A further disappointment was met, when the Sixteenth Supplement came to hand lacking a single nomenclatural ruling — this being preeminently the service which the Committee is well fitted to render. Numerous proposals of changes in generic and specific names have lately been made. Undoubtedly many names previously in use in the Check-List require replacement upon perfectly good grounds. And an authoritative decision in each case, not long delayed, is a desideratum of the active student of birds. Postponement of such action is provoking.

While in such matters as the above one may accept the conclusion of some one systematic worker, the elements in each case are of such a nature that a properly qualified committee of several members can undoubtedly render a correct ruling in a greater number of cases than can one man. Hence the demand for committee action, over that of any one individual.

Examination of the Sixteenth Supplement shows that of proposed additions to the Check-List from the category of vagrant species, four were accepted and three were rejected. In this function (number 3) the rulings of the Committee are gladly accepted. They have considered the evidence offered in each instance, and have rendered judgment.

Further scrutiny shows that in the Sixteenth Supplement, function number 4 was exercised in 34 cases. Thirteen newly proposed subspecies were accepted, 19 were rejected, and two proposed cancellations were rejected. It is this function that, to my mind, has been unsatisfactorily performed. Ha! I can hear the scornful remark from at least seven directions: The splitter is sore; his pet subspecies were turned down! Granted; but let me try to discuss the problem dispassionately, and may my readers consider the matter in like mind.

Up to the present time the Committee has with more and more difficulty tried to meet two totally different ideals in the matter of including subspecies in its Check-List. The trained student of speciation, whom certain thoughtless ones attempt to ridicule by the term 'splitter,' has earned the ability to distinguish characters of phylogenetic value from the host of others which are the confusion of the amateur. This kind of specialist finds it more and more in his power to discriminate the lesser differentiated forms; his senses, his tools for measuring, are becoming refined, and he can discriminate differences which the dilettante cannot. Liken the development of the professional systematic ornithologist to that of the trained microscopist, in whatever field. Would anyone for a moment entertain seriously the dictum that any organisms, which future increase in precision on the part of both the individual and his instruments enable him to discern, should be deemed beneath notice, "not worthy of recognition by name," just because the amateur finds difficulty in seeing them?

Arguments along this line ought to be unnecessary in defense of the systematic ornithologist. The difficulty comes when the Committee is confronted with the results of his refined work. Its action has been anything but consistent. Sometimes the Committee accepts the results of the systematist's work in their entirety; occasionally the whole thing is discarded; and in the last supplement forms are 'accepted' and 'rejected' in hit or miss fashion, to the wonderment of the beholder who happens to be posted in any of the groups affected.

Evidently the Committee feels that it cannot go to the limit. The populace will not stand for it!

For there is, on the other hand, the vast majority of amateur bird students who are confused by the multiplicity of names. Yet they require a reference list of North American birds. Many of the subspecies already

in good standing on the Check-List represent forms far beyond their limited powers of discrimination. They are confused by differences due to age, sex, season, individual variation, and such adventitious factors as wear and fading. This unpopularity of the subspecies is evident in the way they are treated in most popular works on ornithology. They are either disposed of in diamond-type footnotes or appendices, or they are omitted altogether. Not infrequently such opprobrious terms are introduced as 'alleged,' 'extremely slight,' 'subjective,' etc. Yet ninety-nine percent of bird students will resent most vehemently any intimation that their powers of discrimination are limited!

The poor Committee has the amateur on the one hand and the specialist on the other. And neither of these constituencies is satisfied with the present rulings in the Check-List. The term ornithology is a mighty broad one; the phases of the study are many. A man may become an eminent ornithologist in psychology, in anatomy, in classification in the large, in economics — and not have need of any particular ability or knowledge in the technique of species-discrimination. The amateur, as far as subspecific discriminative ability is concerned, constitutes practically all of the Associates of the A. O. U., surely a majority of the Members, and not a few of the Fellows.

Why does the Committee discommode this great majority by 'accepting' as many subspecies as it does? Is it fair to the conscientious student of speciation to maltreat the results of his work as instanced in the genus *Dryobates* in the Sixteenth Supplement?

It seems clear, upon any basis I can think of, that the A. O. U. Check-List with its supplements is of late failing markedly in its usefulness. This is because of the Committee's unhappy attempt at striking a mean between the demands of amateur and specialist. The interests of one or the other should be sacrificed; and as the amateur is in the vast majority, the Check-List should be remodeled to meet his requirements. An expeditious way to do this would be to eliminate all subspecies. There would thus be but one name for the Robin from the Atlantic to the Pacific, only one Song Sparrow and one Horned Lark in all North America. A statement could be appended, wherever appropriate, to the effect that there is geographic variation within the range, birds from desert regions being small and pale, those from the northwest being large and dark; etc.

I venture to say that such a consummation would be hailed with delight by the rank and file of bird students, if not by every one. The interpolation of subspecies in small type as in the Third Edition, is a confusion. As stated before, the subspecies problem as now handled is unsatisfactory to practically all concerned. Such a working list of North American birds should accord with the most modern findings in classification, nomenclature and geographic distribution. The Committee would find good use for its talents in keeping such a list up to date.

Now, I am not for one moment advocating cessation of activities on the part of the student of speciation. He must pursue his investigation

to the farthest limit made possible by his experience and keenness. And may his ability become sharpened until he can distinguish seven Song Sparrows where but one is now known! Furthermore, if one degree of differentiation requires a name, so does every other, even down to the finest discernible. The systematist will continue to provide names for the subspecies he discovers.

The futility of any committee attempting to pass judgment upon the findings of the specialist here becomes obvious. A very good reason is given in the editorial comments alluded to, though couched in an unfortunately disparaging tone: "The specialist working over a group of birds constantly for weeks at a time, unconsciously magnifies the differences which he finds between birds from areas, which he has reason to think, ought to yield separable geographic races." To express the idea with better respect for the judgment of the specialist, it is the worker in a particular group — the man who has scrutinized all available material with minute attention to detail, the man who has become proficient in picking apart the multifarious peculiarities between individual specimens and series, one who can appreciate mass effect — it is that man who is by far the best fitted to render verdicts as to the existence of subspecies.

It would be foolish for *me* to tackle the Hummingbirds of Middle America, even with the largest museum series of skins at hand, with the expectation of giving within seven days an opinion as to the validity of certain proposed forms. Who would place any reliance upon my conclusions? *I* would n't! If it is ridiculous for one person to attempt to pass judgment on a few subspecies of an unfamiliar group with but a few days study, it is logically seven times as ridiculous for seven men to make such an attempt, especially when 34 cases representing 18 genera are to be considered! There is no use making any bones about it — there is too much good evidence of the failure of the Committee in rendering just verdicts as between 'rejected' and 'accepted' subspecies in the Sixteenth Supplement. It is beside the object of the present communication to go into detail in this regard.

I do not mean disrespect towards any one of the Committee members, and certainly no one will arraign me on that score. All of them are busy men. At least three are ordinarily strenuously occupied with other matters than subspecies of birds. They give of their time generously; but who will maintain that in function number 4, it is worth their while from the standpoint of either the amateur or the specialist?

Nor am I advocating that there be no longer an official Check-List of North American birds to include all recognizable subspecies. On the contrary, this is an eminently desirable thing, to constitute a record of achievement in research in avian speciation. I have no doubt, too, but that a large number of non-specialists will always be interested in such results, enough to well warrant its publication.

I do not, however, believe that any committee could handle such a proposition. Rather, let there be a systematic editor appointed by the president of the A. O. U., one qualified through his accuracy in handling

scientific names typographically, as well as by attainments in his own field. Let him be located, preferably, at Washington, because of the library and museum facilities there. His task should be, not to pass judgment upon any forms not in his own special group or groups, but to unify the whole output. This should consist of a co-ordinated set of contributions each from the specialist most familiar with the group concerned. It may well be, then, that but a single person shall stand as authority for the status of forms in any one group; or one student may be responsible for several groups which he may have worked in. The danger of uneven treatment throughout the entire production could not of course be wholly eliminated, because of variability in personal ability or standards, and this in spite of careful editing. But the results would surely be far nearer the truth than those exemplified in the Sixteenth Supplement.

To summarize: the present Check-List, especially as including the last supplement, is unsatisfactory to both the amateur and the specialist in respect to the subspecies problem. It is suggested that a new Check-List, *with subspecies omitted altogether*, would be hailed with appreciation by the great majority of bird students, with whom such an abridged list would meet all requirements.

The Committee, as at present constituted, has all the qualifications to enable it to compile and keep up to date such a Check-List. Such a list of *species* should prove even more popular than the present one.

It is further suggested that an entirely distinct publication, though second in importance, would justify itself, enumerating the results of the specialist's studies to the very limit to which his perceptions allow him to proceed. But it is contended that no committee can have the qualifications in either time or ability, to pass judgment upon all the proposed cases. Rather should such a technical list be a carefully edited compendium of contributions from all specialists of recognized standing, each treating of the group or groups in which he has personally worked.

Respectfully submitted,

JOSEPH GRINNELL.

Museum of Vertebrate Zoölogy,
Berkeley, California,
August 27, 1912.

[In reply to Mr. Grinnell's communication, the author of the editorial remarks on the A. O. U. Committee on Nomenclature and its functions, in 'Notes and News' of the July Auk, begs to say that while he is a member of the Committee, the remarks represented his own personal views on the matters discussed and may or may not reflect the opinions of the Committee as a whole. The same may be said of the following comments upon Mr. Grinnell's communication.

As to the question of classification raised by Mr. Grinnell, the writer feels that there is perhaps as much to be said on one side as the other. If there had been a generally recognized system available it would unques-

tionably have been adopted, but there was not; and the diversity of opinion among avian taxonomists still prevails. Furthermore it should be remembered that a Check-List is by no means necessarily a classification. Its very existence is for convenience, and so it is no light matter to overthrow a sequence, followed by practically all writers on North American birds for a quarter of a century, on the plea of being more scientific when we get nothing more stable than that which we discard.

As to the subspecies question with which Mr. Grinnell is chiefly concerned, we hardly think that he is serious in believing that a list of the binomial names in the present Check-List would answer the needs of the great bulk of the membership of the A. O. U. which he classes as 'amateurs' in matters of subspecific discrimination. He knows perfectly well that there are very many subspecies which are more easily distinguished than are certain species, and for these we must have names. For the purposes of ornithological investigation along any line — life history, habits, geographic distribution, migration, taxonomy, economics, etc. — we must have the birds of the country divided up into minor groups, species or subspecies as you will. The only question is, where shall we draw the line in recognizing the differentiation that nature has effected? The question is a *practical* one, just as the whole matter of naming is practical, and when we recognize by name differentiations so slight that an ornithologist cannot tell what bird he has before him until he submits it to a 'specialist in speciation' for study, then the process has gone too far for general purposes. There is however no test by which we can tell when we have gone too far. The problem is one entirely of degree in which personal opinion and individual ability enter into every case. As already stated the line cannot be drawn between the species and the subspecies, because by our Code they are distinguished not by degree of difference but by the criterion of intergradation. In an effort to fix this line the A. O. U. established the Committee believing that the vote of a Committee would represent the nearest approach possible to the desired result.

We do not believe that the efforts of the Committee have been so entirely unsatisfactory as Mr. Grinnell implies, except of course to 'students of speciation' who make a specialty of naming differentiations no matter how small, regardless of whether the results of their work can be utilized by specialists in the various other branches of ornithology. It was for the latter we think that the Check-List was conceived. It was surely never intended for such a 'specialist in speciation' as Mr. Grinnell predicts who would name every finest discernible differentiation and would if possible make 140 races of Song Sparrows out of the 20 now recognized. In European ornithology the same effort is evident in check-lists and catalogues to recognize practical subspecies but to reject those based in extremely slight differentiations, and this by ornithologists who can hardly be charged with catering to the amateur.

Mr. Grinnell will perhaps understand better the attitude of the large majority of ornithologists toward the subspecies if he will but consider

his own attitude toward the genus. He must use generic names in his 'speciation' researches but he has no inclination to halt the latter while he investigates generic taxonomy. Consequently he cheerfully accepts the opinions of the A. O. U. Committee on all generic problems and even goes so far as to say that this is a function in which "the great value of a committee of arbitration is beyond any possibility of dispute." In exactly the same spirit investigators in other fields of ornithology accept the decisions of the Committee in regard to subspecies. As a matter of fact the two problems are precisely similar and the opinion of the Committee is not one whit more valuable in deciding how many genera should be recognized than it is in the case of recognition of subspecies. However we are digressing from the point at issue. Mr. Grinnell charges that the Committee has been inconsistent — has gone too far in some cases and not far enough in others. This may readily be granted and right here lies the crux of the whole matter. How is the Committee to know when it has overstepped the line? How can any one judge of consistency in such matters? Subspecies are separated from one another by all possible degrees of difference and the whole question as before stated is one of individual opinion.

Mr. Grinnell's suggestion of a committee of one for each family or genus, as the case may be, does not appeal to the writer as practicable and he doubts whether the opinion of a selected specialist on Fringillidae, as to the number of recognizable races of *Melospiza* in California would be any more acceptable to Mr. Grinnell than are the opinions of the long-suffering Committee.

If any practicable plan can be devised however by which the work of the 'speciation specialist' may receive full recognition without impairing the utility of the Check-List for other specialists, the writer would give it his hearty support. And if the Committee could be relieved of the burden of passing upon the merits of the various proposed subspecies he feels sure that the proposition would be hailed with delight 'from seven different directions.'

Any departure along these lines however would necessitate a reconsideration of all the subspecies of the Check-List and could not be exploited until a new edition was demanded. Perhaps by that time a committee may be found which will undertake this task and divide the subspecies into two categories, (1) those regarded as of practical utility, as above explained; (2) those recognized by 'specialists on speciation'. Then we should have the entire history of each group before us. This would probably approach nearer to consistency than does the present Check-List, in which most of the inconsistency arises from the different attitude and different make-up of the Committee at the times at which the various cases were considered. This plan too would accord in a measure with Mr. Grinnell's suggestion except that the utility line would not be drawn between the species and the subspecies a proposal that as already explained is quite indefensible. And now just a word upon some remarks of Mr. Grinnell regarding the work of the Committee. He charges that the Committee has felt the necessity

of pleasing both the amateur and the specialist. In this the writer thinks he is mistaken. The Committee has tried to decide each subspecies case upon its merits regardless of how its opinion might affect any individual or class. Such inconsistencies as have resulted were unintentional and due to the lack of any standard in such matters — not to any feeling of obligation to anyone.

The only instance where the Committee has acted in deference to the views of amateur ornithologists — and scientific ones too as it happens — was in the withholding of nomenclatural opinions from the Sixteenth Supplement. This was done in view of the widespread disgust at 'name shuffling' and the diverse interpretation of Article 30 of the International Code, pending an opinion by the International Commission. It was thought far better to temporarily withhold decisions which might have to be reversed in a year or two.

Further on Mr. Grinnell adopts a rather unfortunate simile in discussing the Committee's work. He rightly contends that his judgment upon the validity of proposed new forms in a group of Middle American Hummingbirds with which he was quite unfamiliar would not be worth much if based upon but a few days study. In the case of the Committee however he seems to forget that the members are fairly familiar with North American birds and that many of the races which modern 'speciation specialists' have honored with names were worked out but not named by members of the Committee years ago. Furthermore what knowledge one member of the Commitee lacks another may possess so that the efforts of the Committee are certainly not seven times as ridiculous as the efforts of any one of them individually. In not a few cases moreover the Committee has had more material before it than had the describer of the proposed new race.

The writer welcomes Mr. Grinnell's communication because it shows the proper spirit of coöperation. Everyone will have different opinions on such matters as he has discussed and only by bringing them forward can we achieve results approximately satisfactory to all. The Committee certainly desires to produce satisfactory results and to raise the Check-List to the highest efficiency and if its methods are wrong the sooner the fact is demonstrated the better.

WITMER STONE.]

Aves in the International Catalogue of Scientific Literature.

THE EDITOR OF 'THE AUK':

Dear Sir: It has occurred to me that the accompanying table may be of some interest to your readers and may also incidentally be of assistance to the writer who is engaged in the task of compiling the 'Aves' portion of the Zoölogical Record and the International Catalogue of Scientific Literature. The Zoölogical Record which was founded nearly 50 years

ago by a small body of subscribers and was subsequently taken over by the Zoölogical Society was in 1906 amalgamated with the zoölogical portion of the International Catalogue of Scientific Literature and has now reached its 48th annual issue. The International Catalogue of Scientific Literature was established in 1900 and is in effect a continuation of the Royal Society's Catalogue of Scientific Papers which when completed will cover the period 1800–1900.

By an arrangement made between the Royal Society and the scientific representatives of most of the other countries of the world appointed by their respective governments an International Organization was established, by means of which each of the component countries collects the titles of all papers and works of scientific importance published within their limits and forwards them to the International Bureau in London. These titles which are all written on separate slips, are by the Bureau distributed to the recorders or compilers of the various subjects of which there are 17 in all, Zoölogy forming one.

The duty of each Recorder is to arrange all the titles received for publication and to search for other titles which have been omitted or passed over by the regional bureaus of the co-operating states. It is also the duty of the Recorder to collect titles from those states which do not co-operate as well as those published in the British Islands.

As regards the Aves portion of the Catalogue I find some countries provide a very complete series of titles while others do not and one of the objects of this letter and the accompanying table is to draw attention to this fact. In the first column of the table is given the number of titles collected by the Recorder himself, in the second column the number which has reached him through the Bureau. It will be seen that out of 307 titles of Ornithological papers and publications coming from the United States 40 were supplied by the Recorder.

It is also very desirable for the Recorder to verify all the titles sent in so as to be able to reject those which are of no scientific value and importance. I find in the case of 'Aves' titles from the United States that this is by no means easy as so many of the minor and more local periodicals are not to be found on the shelves of the great scientific libraries in London. For instance I have not been able to see in London such publications as Bird Lore, Cassinia, the Journal of the Maine Ornithological Society and other local journals of the same type. I hope therefore that if these lines are seen by the editors of these journals they will take steps to arrange that copies may be regularly transmitted to the Library of the Natural History Museum in Cromwell Road or to that of the Zoölogical or Royal Societies so that the Recorder may have an opportunity of seeing them.

Yours faithfully,

W. L. Sclater,
Corresponding Fellow A. O. U., Recorder of Aves.

TITLES OF 'AVES' OF 1911.

	Collected by the Recorder	Sent in by the Regional Bureaus.	Total.
British Islands	371	—	371
United States	40	267	307
Germany	37	298	335
France	65	74	139
Russia	0	115	115
Australia	15	31	46
Italy	12	24	36
India	20	12	32
Austria	1	28	29
Hungary	17	7	24
Switzerland	8	14	22
Sweden	2	17	19
Denmark (and Iceland)	2	15	17
Holland	4	12	16
Finland	0	11	11
South Africa	3	8	11
Canada	8	0	8
Belgium	6	0	6
Malay Peninsula	6	0	6
Norway	2	2	4
Philippine Islands	4	0	4
Japan	0	3	3
British East Africa	3	0	3
Cuba	3	0	3
Argentine Republic	3	0	3
Bohemia	1	1	2
Portugal	2	0	2
Luxemburg	1	0	1
Roumania	1	0	1
Servia	1	0	1
Egypt and E. Soudan	1	0	1
Barbados	1	0	1
British Guiana	1	0	1
Brazil	1	0	1
Mexico	1	0	1
Chile	1	0	1
New Zealand	1	0	1
	645	939	1584

NOTES AND NEWS.

WILHELM AUGUST HEINRICH BLASIUS, M. D., Ph.D., a Corresponding Fellow of the American Ornithologists' Union, died at his home, Brunswick, Germany, on May 31, 1912, after a prolonged illness. He was born in Brunswick, July 5, 1845, son of the celebrated naturalist Prof. Dr. Johann Heinrich Blasius, the author of 'Saügethiere Deutschlands' and co-author with Count Keyserling of 'Die Wirbelthiere Europas'. His brother the equally celebrated ornithologist Rudolph Blasius died only a few years ago.

Wilhelm Blasius was since 1871 professor of Zoology and Botany in the Herzogliche Technische Hochschule in Brunswick and was director of both the Natural History Museum and the Botanic Garden, in the same city, as well as a member of the Council of the Deutsche Ornithologische Gesellschaft and member and honorary member of many scientific societies. He was a voluminous author of papers and memoirs dealing with ornithology, mammalogy, anthropology and archæology, among them a monographic account of the Great Auk (*Plautus impennis*) which appeared in 1903.

Prof. Blasius visited America in 1907 as a delegate to the International Zoölogical Congress in Boston and will be remembered by those who met him as a man of the most lovable disposition and sterling qualities, whose high scientific attainments were combined with a personality which attracted all with whom he came in contact.

JOHN GERRARD KEULEMANS, the well known artist, died in London, England, March 29, 1912. He was born June 8, 1842, at Rotterdam, Holland, but did not become well known until he settled in England in 1869. From that time on almost every illustrated ornithological work published in England contained products of his brush, from the first volume of the 'British Museum Catalogue of Birds' to the last part of Mathews' 'Birds of Australia.'

ONE is astonished in glancing through the foreign ornithological journals to see the extent to which bird-banding or 'ringing' has been carried recently and the returns that have been obtained. The results are not only interesting and valuable in the case of migrants shot or captured far from the place at which they were banded, but also in the case of 'resident' species.

Mr. N. H. Joy of Bradfield, Berkshire, England, captured and 'ringed,' during two years, upwards of 1500 Starlings in a cage trap located near his house, besides 'ringing' a number of nestlings. Many of these birds were re-caught several times and the accumulation of data is yielding valuable results. Mr. Joy finds that he catches in the trap only about 5% of the nestlings 'ringed' each year, and feels sure that a large number of them

must leave the immediate vicinity where they were hatched. He finds also that a large proportion of winter Starlings are migrants or visitors from elsewhere. Such data bear directly upon the extent of migration in so called resident birds, such as our Song Sparrow which is present as a species throughout the year over a large part of its range, though there is doubtless a migration of individuals to a greater or less extent.

The most remarkable case of long flight recorded among the captures of 'ringed' birds was that noticed in the 'Ornithologische Monatsberichte' for July–August, of a nestling Gull (*Larus ridibundus*) banded at Rossitten, Germany, on the east coast of the Baltic Sea, July 18, 1911, and shot in November of the same year near Bridgetown in the island of Barbados!

Mr. Leo E. Miller, who has been collecting in Colombia for the American Museum of Natural History, and whose success in discovering the nest of the Cock-of-the-Rock was mentioned in the last issue of 'The Auk', reached New York City on September 9, after eighteen months' continuous field work in the tropics. Mr. Miller brought with him some twenty-three hundred birds and mammals collected since the expedition left Cali in the Cauca Valley in February, 1912. A recently completed government road over the eastern Andes enabled Mr. Miller to go from the headwaters of the Magdalena to the headwaters of the Amazon in the Caquetá territory. He is doubtless the first zoölogical collector to penetrate this region, and during the thirty days which he worked there secured eight hundred birds and mammals; practically none of which were represented in the Museum's previous Colombian collections.

The U. S. Bureau of Fisheries now has a naturalist on the Pribilof Islands whose duty it is to study not only the fur seals and blue foxes, but all other natural history questions relating to the islands. Exceedingly interesting results are already coming in and we learn from Dr. Barton W. Evermann that in a collection recently received there are specimens representing eighteen species of birds new to the avifauna of the Pribilofs of which four are new to North America. A detailed account of them will appear in the next number of 'The Auk.'

We learn from 'The Ibis' that Dr. A. J. R. Wollaston sailed May 24, for Borneo where he will prepare for another expedition to New Guinea in conjunction with Mr. C. B. Kloss. They hope to reach the Snowy Range and if possible to ascend Mt. Carstensz 15,964 ft.

A fitting tribute to the last ornithological effort of the late Dr. Bowdler Sharpe — his 'Hand-List of Birds' — is a general index to this work which has been recently issued by the British Museum. This index has been edited by Mr. W. R. Ogilvie-Grant, while the actual task of amalgamating the indices of the several volumes was accomplished by his assistant, Mr. Thomas Wells. It is interesting to know that a specially prepared copy

of the 'Hand-List' has been provided for use in the Museum in which is noted the number of the cabinet and drawer in which each species is to be found. When Dr. Sharpe took charge of the collection in 1872 it consisted of about 30,000 specimens while at the time of his death it was supposed to consist of about 500,000 skins and eggs. We find in the index two genera, *Sharpia* and *Bowdleria* and forty-one species named in honor of Dr. Sharpe, more namesakes apparently than have been bestowed upon any other ornithologist.

THE ANNUAL GENERAL MEETING of the British Ornithologists' Union for 1912 was held in London on May 8th. The officers for the ensuing year are President, Dr. F. DuCane Godman; Secretary, Mr. J. Lewis Bonhote; while Mr. William Lutley Sclater was chosen editor of the tenth series of 'The Ibis' covering the six years beginning with 1913.

Medals were awarded to the following members of the British Ornithologists' Union Expedition to New Guinea: Mr. Walter Goodfellow, Dr. A. F. R. Wollaston, Mr. G. C. Shortridge and Mr. Claude H. B. Grant. It was announced that the new edition of the 'List of British Birds' published in 1883 would be ready for the press during the coming winter.

DOUBLEDAY, PAGE & COMPANY, Garden City, New York, announce a work on the Birds of Eastern North America by Chester A. Reed, with 408 illustrations in color and many in black and white.

WE are informed that Mrs. M. Blasius, Inselwall 13, Braunschweig, Germany, sister-in-law of the late Prof. Wilhelm Blasius desires to dispose of the specimen of the Great Auk which was contained in his collection. Year by year the specimens of this interesting bird find their way into the public museums where they are likely to remain permanently, so that this is probably one of the last opportunities that will occur of obtaining a specimen.

SOON after the organization of the Delaware Valley Ornithological Club in 1890 the members began to form a collection of the nests and eggs of the birds breeding in Pennsylvania and New Jersey, and presented it to the Academy of Natural Sciences of Philadelphia for exhibition in the museum. Later the collection was extended to include specimens of the birds as well, and additional nests were secured, until at the present time all the birds of the two states are represented with the exception of a few accidental stragglers, while out of about one hundred and fifty species known to nest within the region, the nests of one hundred and thirty are represented, all of them actually obtained in Pennsylvania or New Jersey. In many cases accessories have been added and the nest and birds mounted in a natural group. The collection has recently been entirely rearranged and displayed

to much better advantage, and every effort is now being made by the Club to secure nests and eggs of the few species still lacking in order that the collection may be absolutely complete.

As already announced the thirtieth stated meeting of the American Ornithologists' Union will be held at Cambridge, Mass., November 12–14, 1912, with a business meeting of the Fellows on the evening of the 11th; all Members and Associates are urged to attend the sessions. Only those who have attended previous meetings realize how stimulating is this annual association with fellow ornithologists, and how much each one can advance the cause of bird study by helping to swell the roll of those present.

INDEX TO VOLUME XXIX.

[New generic, specific, and subspecific names are printed in **heavy-face** type.]

ABBOTT, Clinton G., review of his 'Home-Life of the Osprey,' 125.
Academy of Natural Sciences of Philadelphia, Centennary of, 282.
Acanthis, 409.
linaria, 113.
linaria linaria, 77, 111, 202.
Accipiter cooperi, 40, 80, 375, 470.
nisus teneriffæ, 425.
velox, 19, 43, 72, 80, 332, 477, 515.
Actitis macularia, 19, 31, 76, 80, 331, 469, 514.
Æchmophorus occidentalis, 42.
Ægialitis meloda, 72, 238.
semipalmata, 514.
Ægolius, 410.
Æstrelata, 410.
fisheri, 261.
hasitata, 511.
Africa, birds of, 121, 139, 261, 267, 270, 410, 421, 422, 423, 424, 426, 552.
Agelaius phœniceus, 28.
phœniceus fortis, 277.
phœniceus neutralis, 277, 333.
phœniceus phœniceus, 21, 82, 473, 519.
Aithurus, 257.
Aix sponsa, 39, 80, 512.
Ajaia ajaja, 42.
Alabama, birds of, 356.
Alaska, birds of, 118, 129, 242, 260.
Alberta, birds of, 400, 539.
Alca torda, 399.
Alcedo meninting proxima, 552.
Alcyone ramsayi, 271.
Alethe polioparea, 425.
uellensis, 425.
Algiers, birds of, 183–184.
Alle alle, 399.
Allen, Francis H., remarks on the case of Roosevelt *vs.* Thayer, with a few independent suggestions on the concealing coloration question, 489–507.
Allen, J. A., 'Matthew's Notes on Nomenclature,' 133–135; retirement as editor of 'The Auk,' 136.
Alseonax poensis, 424.
Aluco, 409.
pratincola, 31, 81, 517.
American Museum of Natural History, bird groups in, 281; Colombian Expedition of, 434, 572.
American Ornithologists' Union Committee on Nomenclature, province of, 431, 561, 565.
American Ornithologists' Union, Twenty-ninth stated meeting of, 92–99; Thirtieth stated meeting of (announcement), 435, 573.
Amizilis, 257.
chalconota, 257.
tzacatl, 257.
Ammodramus bairdi, 72.
savannarum australis, 41, 82, 474, 521.
savannarum bimaculatus, 253, 400.
Ammomanes deserti algeriensis, 555.
Ampelis, 410.
cedrorum, 37.
garrulus, 43.

Amphispiza nevadensis nevadensis, 335.
Anairetis parulus, 144.
Anas, 409.
aberti, 305.
diazi, 295–297, 306.
fulvigula, 297.
fulvigula maculosa, 297.
maculosa, 297.
obscura rubripes, 176–179.
platyrhynchos, 38, 511.
rubripes, 42, 234, 442, 511.
rubripes tristis, 19, 177–179.
superciliosa, 534.
tristis, 299.
wyvilliana, 301.
Andaman Islands, birds of the, 119.
Andrews, Roy C., notice of his expedition to Korea, 138.
Anhinga, 398.
'Annales des Sciences naturelles,' review of, 426.
Anser albifrons gambeli, 39, 201.
Anthony, A. W., eastern Oregon notes, 253.
Ant-thrushes, 144.
Anthus bogotensis, 144.
rubescens, 37, 144, 525.
spragueï, 72, 400.
Antrostomus carolinensis, 43.
cubanensis, 394.
vociferus, 32, 472, 518.
vociferus vociferus, 81, 376.
Apalis rufogularis kamerunensis, 424.
Aphelocoma californica californica, 549.
californica obscura, 549.
woodhousei, 333.
Aptenodytes chrysocome, 124.
patagonica halli, 124.
pennanti, 559.
'Aquila,' review of, 423.
Aquila chrysaëtos, 43, 254, 255, 332, 516.
Archæopteryx, 285.
Archibuteo lagopus sancti-johannis, 399.
Archilochus, 257, 472, 518.
colubris, 21, 32, 81, 376.
Architrochilus, 258.
Ardea, 423.
herodias, 39.
herodias herodias, 19, 331, 375, 477, 512.
Arizona, birds of, 363–368, 421.
Arkansas, birds of, 112, 259, 346.
Arnold, Edward, a short summer outing in Newfoundland, 1911, 72–79.
Arnold, W. W., bird enemies of the Chinese cotton scale, 113.
Arquatella maritima, 396.
Arremon aurantiirostris occidentalis, 268.
Arremonops rufivirgatus rufivirgatus, 255.
tocuyensis, 419.
Aru Islands, birds of the, 117.
Asio flammeus, 40, 110, 517.
wilsonianus, 40, 255, 477.
Astragalinus, 409.
psaltria psaltria, 333.
tristis, 29.
tristis pallidus, 333.
tristis tristis, 21, 82, 322, 377, 474, 520.
Astur atricapillus atricapillus, 76, 110, 515.
Asyndesmus lewisi, 332, 400.
Attagis chimborazensis, 148.
Atthis morcomi, 257.
Auk, Great, 208–209, 264, 573.
Razor-billed, 399.
Australia, birds of, 124, 266, 271, 411, 422, 423, 426, 549.
Automolus klagesi, 425.
watkinsi, 425.
'Avicultural Magazine,' review of, 272, 423, 555.
Avocet, 42, 72.

Bæolophus bicolor, 41, 84, 376, 477, 526.
wollweberi, 335.
Bahama Islands, birds of the, 123.
Bailey, H. B., notes on birds breeding in the mountains of Virginia, 79–84.
Bailey, S. Woldo, Red-headed Woodpecker at Newburyport, Mass., 541; mimicry in the song of the Catbird, 545.
Baldpate, 38, 511.
Bangs, Outram, a new subspecies of the Ruffed Grouse, 378–379.
Barbatula chrysocoma schubotzi, 424.
Barbour, Thomas, and J. C. Phillips, reply to their criticism of Thayer's 'Concealing Coloration,' 498–507.
Barrett, Harold, L., the Laughing Gull at Marshfield, Massachusetts, 99.
Barrows, Walter B., review of his 'Michigan Bird-life,' 547.
Bartramia longicauda, 31, 72, 254, 514.
Basilinna leucotis, 257.
Bates, G. L., review of his 'Further Notes on the Birds of Southern Camaroon,' 123.
Beal, F. E. L., see McAtee, W. L.
Beebe, C. William, notice of his 'New Blood Pheasants,' 552.
Beebe, C., William and Lee S. Crandall, review of their 'The Undescribed Juvenal Plumage of the Yucatan Jay,' 263.
Bent, Arthur C., review of his 'A New Subspecies of Ptarmigan from the Aleutian Islands' and 'Notes on Birds observed during a Visit to the Aleutian Islands and Bering Sea,' 260–261.
Bergtold, W. H., the Snowy Egret in New Mexico, 237; October birds of the headwaters of the Gila River, New Mexico, 327–336.
Berlepsch, Hans Graf von, review of his 'Revision of the Tanagers,' 268; review of his 'Birds of the Aru Islands,' 117.
Bermuda, birds of, 49–71.
Betts, Norman deW., notes from Boulder County, Colo., 399.
Bird-banding, 280–281, 571.
Bird-collecting, 136–137.
'Bird Lore,' review of, 270, 420, 554.
'Bird Notes,' review of, 423, 556.
Bishop, Louis B., birds in the markets of southern Europe, 179–190; an apparently unrecognized race of the Red-shouldered Hawk, 232–233.
Bittern, 19, 30, 75, 236, 477, 512.
Least, 30, 100, 399.
Blackbird, Brewer's, 41, 333.
Crow, 455.
Red-winged, 21, 28, 82, 412, 473, 519, (see also Redwing).
Rusty, 43, 77, 202, 211, 395, 520.
Yellow-headed, 41, 102, 103, 333.
Blackpoll, 211.
Blasius, Wilhelm, obituary of, 571.
Bluebill, 443.
Bluebird, 23, 30, 84, 317, 376, 477, 527.
Chestnut-backed, 336.
Mountain, 336.
Bobolink, 21, 43, 254, 277, 323, 325. 478, 519.
Bob-white, 28, 80, 376, 477, 514.
Bolles, Frank, notes on Whip-poor-wills and Owls, 150–159.
Bolt, Benj. F., capture of a Golden Eagle at Kansas City, Mo., 102.
Bombycilla, 410, (see also Ampelis).
cedrorum, 22, 83, 323, 373, 375, 400, 475, 523, (see also Ampelis).

Bombycilla garrula, 111, 204, 251, (see also Ampelis).
Bonasa umbellus **thayeri**, 378–379.
umbellus togata, 19, 324.
umbellus umbellus, 80, 371, 375, 469, 514.
Botaurus lentiginosus, 19, 30, 75, 236, 477, 512.
Boyle, Howarth S., early occurrence of the Saw-whet Owl, 239.
Brachypteryx goodfellowi, 555.
Brachyramphus marmoratus, 549.
Bradlee, Thomas S., Mockingbird Notes from Massachusetts, 249.
Bradypteris bedfordi, 555.
Bragg, L. M., notice of her supplement to the 'Birds of South Carolina,' 418.
Brant, 39.
Branta bernicla glaucogaster, 39.
canadensis, 39.
canadensis canadensis, 75, 391, 512.
canadensis hutchinsi, 39, 536.
canadensis occidentalis, 549.
Brewster, William, In Memoriam: Henry Augustus Purdie, 1–15; notes on the flight of Gulls, 85–92; foreword to Bolles' 'Notes on Whip-poor-wills and Owls,' 150–151.
Bridge, Lidian E., uncommon shorebirds seen in Essex county, Massachusetts, 537; another occurrence of the Blue-gray Gnatcatcher in Essex county, Massachusetts, 546.
Brimley, H. H., Brown Pelican in Pamlico Sound and at Durham, N. C., 531; Ocracoke water-bird notes, 538.
Brisson's genera of birds, 134.
'British Birds,' review of, 272, 422, 556.
British Columbia, birds of, 117, 252, 265, 396.
British Ornithologists' Union, annual meeting of, 573.
Brock, Henry H., recent occurrence of the Egret (*Herodias egretta*) near Portland, Maine, 236.
Brockway, Arthur W., Black Ducks which became very tame, 234; a Catbird spending the winter in Connecticut, 249.
Brooks, Allan, some British Colombia records, 252.
Brooks, Earle A., notes from West Virginia, 111–112.
Brooks, Winthrop Sprague, notes from the Magdalen Islands, 112; an additional specimen of the Labrador Duck, 389; late record of the Red-backed Sandpiper (*Pelidna alpina sakhalina*), 391; Laughing Gull in Plymouth county, Massachusetts, 531.
Brooks, Winthrop S., and Stanley Cobb, a correction, 400.
Brown, Edward J., rare Virginia birds, 399.
Brown, Nathan Clifford, many Purple Finches at Portland, Maine, in February, 245; a correction, 429; a third Blue-gray Gnatcatcher in Maine, 546.
Bruner, Stephen C. and Feild, Alexander L., notes on the birds observed on a trip through the mountains of western North Carolina, 368–377.
Bryan, William Alanson, the introduction and acclimatization of the Yellow Canary on Midway Island, 339–342; see also Dill, Homer R.
Bryant, Harold C., review of his 'The Relation of Birds to an Insect Outbreak in Northern California during the Spring and Summer of 1911, 416; review of his 'The Present and Future of

the California Valley Quail,' 551.
Bubo virginianus pallescens, 332.
virginianus virginianus, 81, 240, 471, 517.
Buffle-head, 39, 254, 444, 512.
'Bulletin of the British Ornithologists' Club,' review of, 271, 422, 555.
'Bulletin of the N. Y. Zoölogical Society,' review of, 559.
Bulweria bulweri, 412.
Bunting, Indigo, 33, 82, 111, 321, 377, 474, 522.
Bunting, Painted, 43, 247.
Bunting, Rustic, 384.
Bunting, Snow, 43, 111, (see also Snowflake).
Burns, Frank L., review of his 'Monograph of the Broad-winged Hawk,' 259–260.
Burr, Freeman F., note on the Bald Eagle and Osprey, 393.
Buteo borealis, 35.
borealis borealis, 19, 376, 470, 515.
borealis calurus, 332.
borealis krideri, 31.
lineatus, 40.
lineatus lineatus, 80, 375, 477, 516.
lineatus **texanus**, 232–233.
platypterus, 19, 72, 470, 516.
platypterus cubanensis, 260.
swainsoni, 35.
Butorides virescens, 30, 80.
virescens virescens, 377, 468, 513.

Cahn, Alvin R., the freezing of Cayuga Lake in its relation to bird life, 437–444.
Calamonastes simplex erlangeri, 425.
simplex hilgerti, 425.
Calcarius lapponicus. lapponicus, 111, 204, 246.
Calidris alba, 208.
California, birds of, 118, 137, 270, 416, 421, 548, 551.
Calliope, 385.
calliope, 261.
calliope calliope, 385.
calliope camtschatkensis, 385.
Callocalia fuciphaga amechana, 411.
fuciphaga mearnsi, 411.
fuciphaga tachyptera, 411.
Calophasis mikado, 555.
Calospiza gyroloides bangsi, 268.
gyroloides catharinae, 268.
Calyptophilus, 268.
Camaroptera superciliaris kamerunensis, 424.
Camptorhynchus labradorius, 389.
Campylorhamphus trochilirostris major, 257.
Canachites canadensis atratus, 385.
Canada, birds of, 129.
Canary, Yellow, 339–342.
Canutus, 409.
Canvas-back, 39, 108, 442, 448, 512.
Cardinal, 29, 82, 377, 395, 461, 478, 522.
Cardinalis cardinalis cardinalis, 29, 82, 377, 395, 478, 522.
Carduelis, 409.
Carpodacus mexicanus frontalis, 333.
mutans, 24, 336–338, 543.
purpureus purpureus, 21, 245, 322, 520.
'Cassinia,' review of, 268.
Catarractes, 124.
Catbird, 34, 83, 106, 249, 376, 476, 525, 545.
Catharista urubu, 80, 515.
Cathartes aura septentrionalis 31, 80, 332, 376, 470, 515.
Catherpes mexicanus conspersus, 335, 400.
Catoptrophorus semipalmatus inornatus, 40, 72, 537.
Centurus aurifrons, 241.
carolinus, 31, 81, 517.

Centurus uropygialis brewsteri, 386.
Cepphus grylle, 75.
Cerchneis naumanni turkestanicus, 426.
Certhia familiaris americana, 23, 37, 374, 375, 526.
familiaris buturlini, 426.
familiaris montana, 335.
Certhilauda kalahariæ, 555.
Ceryle alcyon, 20, 31, 76, 81, 376.
alcyon alcyon, 332, 382, 471, 517.
alcyon caurina, 265, 382.
americana isthmica, 261.
Chætura pelagica, 20, 32, 81, 323, 376, 472, 518.
Chansler, E. J., Mississippi and Swallow-tailed Kites in Knox Co., Ind., 239.
Chapman, Frank M., review of his 'Handbook of Birds of Eastern North America.' Revised Edition, 402; review of his 'Diagnosis of apparently New Colombian Birds,' 552; review of his 'A New Ibis from Mt. Kenia, British East Africa,' 552; retirement as associate editor of 'The Auk,' 136.
Charadriiformes, 287.
Charadrius dominicus, 43.
dominicus dominicus, 101.
Charitonetta, 409.
albeola, 39, 254, 444, 512.
Chat, Yellow-breasted, 34, 83, 377, 476, 525.
Chaulelasmus, 409.
streperus, 38.
Chelidon, 410.
Chen cærulescens, 39.
hyperboreus, 39.
hyperboreus hyperboreus, 201.
Chickadee, 23, 30, 78, 319.
Black-capped, 374, 375, 477.
Carolina, 84, 377, 526.
Hudsonian, 23, 412.
Chickadee, Long-tailed, 399.
Mountain, 335.
Valdez Chestnut-sided, 385.
Chlamydodera, 556.
Chlidonias, 198.
nigra surinamensis, 198.
Chloris chloris, 558.
Chloropsis aurifrons, 556.
Chondestes grammacus, 33.
grammacus grammacus, 395.
Chordeiles virginianus, 32.
virginianus virginianus, 20, 76, 81, 265, 472, 518.
Chroicocephalus ridibundus lavrovi, 425.
Chrysomitris spinus buturlini, 424.
Chrysoptilus ujhelyii, 557.
Chrysotrogon, 257.
Chrysotrogon ramonianus goeldii, 257.
Chuck-will's-widow, 43, 259.
Cinclodes fuscus albidiventris, 146.
Cinclus mexicanus unicolor, 335.
Cinnyris chloropygius uellensis, 425.
Circus hudsonius, 19, 35, 332, 477, 515.
Cisticola alleni, 261.
difficilis, 261.
hypoxantha reichenowi, 261.
kalahariæ, 555.
prinoides kilimensis, 261.
ruficapilla bororensis, 557.
strangei kapetensis, 261.
subruficapilla æquatorialis, 261.
subruficapilla borea, 261.
Cistothorus brunneiceps, 143.
stellaris, 478, 526.
Clangula, 409, 410.
clangula americana, 19, 42, 75, 444.
Clark, A. H., review of his 'The Ontogeny of a Genus,' 411.
Clark, Hubert Lyman, notes on the Laysan Finch, 166–168.
Clarke, William Eagle, review of his 'Studies in Bird Migration,' 403–405.

Cleaves, Howard H., As to bird banding, 280–281.
Coale, Henry K., Ixobrychus exilis in Texas, 100; Dendroica æstiva captured by a spider, 105; Waterfowl nearly drowned, 107; Columbian Sharp-tailed Grouse in Wisconsin 238; correction, 250.
Cobb, Anna E., the Bohemian Waxwing in Vermont in Summer, 104.
Cobb, Stanley, see Brooks, Winthrop S.
Coccothraustes vespertinus montanus, 113.
Coccyzus americanus, 31.
americanus americanus 81, 471, 517.
erythrophthalmus, 20, 31, 81, 317, 471, 517.
minor maynardi, 393.
Cockerell, T. D. A., birds and the cotton scale, 400.
Cœreba, 555.
cayannensis, 555.
chloropyga alleni, 422.
luteola montana, 555.
pacifica, 422.
Colaptes, 229.
auratus auratus, 81.
auratus borealis, 386.
auratus luteus, 20, 28, 76, 202, 241, 376, 472, 518.
cafer collaris, 36, 332.
chrysoides brunnescens, 383.
chrysoides chrysoides, 383.
chrysoides mearnsi, 384.
Colinus virginianus, 28.
virginianus virginianus, 80, 376, 477, 514.
Colœus monedula cirtensis, 426.
Colombia, birds of, 268, 419, 434, 552, 573.
Colorado, birds of, 139, 258, 277, 399, 400, 429, 544.
Columba asiatica, 381.
Columba fasciata fasciata, 331, 539.
sodalicia, 424.
trudeaui, 381.
Colymbus, 124, 132, 133.
auritus, 441, 510.
holbœlli, 233, 439.
nigricollis californicus, 42.
Compsothlypis americana americana, 377.
americana usneæ, 23, 324, 478, 523.
pitiayumi elegans, 419.
Condor, 149.
'Condor,' review of, 270, 421.
Connecticut, birds of, 118, 233, 234, 249, 532.
Conopophaga snethlageæ, 424.
Conover, F. L., Franklin's Gull in Wisconsin, 388.
Conuropsis carolinensis, 343–363.
Cooke, Wells W., Passenger Pigeon (*Ectopistes migratorius*) in Alberta, 539; proper name for the Nashville Warbler, 545; review of his 'Distribution of the American Egrets,' 119; comments on his 'Distribution and Migration of North American Shorebirds,' 128–131.
Cooper Ornithological Club, committees of, 283.
Coot, 513.
American, 31.
Copsychus saularis pagiensis, 552.
Cormorant, 538.
Double-crested, 19, 42.
Corvus brachyrhynchos, 28.
brachyrhynchos brachyrhynchos, 21, 77, 82, 320, 473, 519.
brachyrhynchos hesperis, 333.
corax, 28.
corax principalis, 77, 372, 375, 473, 519.
cryptoleucus, 333.
Costa Rica, birds of, 419.

Coturnicops noveboracensis, 100, 237.
Coward, T. A., notice of his 'The Migration of Birds,' 419.
Cowbird, 32, 82, 110, 244, 473, 519.
Craig, Wallace, pigeons do not carry their eggs, 392.
Crandall, Lee S., see Beebe, C. W.
Crane, Little Brown, 40.
Sandhill, 40, 277.
Whooping, 40.
Craspedoprion ntermedius, 419.
Crateropus caudatus altirostris, 557.
caudatus salvadorii, 557.
Creciscus, see Porzana.
Creeper, Brown, 23, 37, 374, 375, 412, 526.
Rocky Mountain, 335.
Crossbill, 77, 245, 324, 520.
Mexican, 333.
Red, 21.
White-winged, 21, 43, 202, 324.
Crow, 21, 28, 77, 82, 320, 325, 459, 473, 519, 542.
Western, 333.
Cryptoglaux acadica acadica, 102, 239, 251, 517.
funerea, 410.
Cryptospiza borealis, 422.
Cuba, birds of, 100, 103, 393, 394, 395, 396.
Cuckoo, Black-billed, 20, 31, 81, 317, 471, 517.
Maynard's, 393.
Yellow-billed, 31, 81, 471, 517.
Curlew, Eskimo, 398.
Hudsonian, 40.
Long-billed, 40.
Cyanocephalus cyanocephalus, 110, 333.
Cyanocitta cristata, 32.
cristata cristata, 21, 82, 377, 473, 519.
stelleri diademata, 109, 333.
Cypseloides, 257.
Cyrtonyx montezumæ mearnsi, 331.
Dafila acuta, 39, 201, 235, 511.
Dearborn, Ned, review of his 'The English Sparrow as a Pest,' 413.
Delaware, birds of, 246.
Delaware Valley Ornithological Club, notice of, 283; collection of, 573.
Dendragapus richardsoni, 252.
Dendrocolaptidæ, 143.
Dendrocopos analis longipennis, 425.
Dendroica, 162–163.
æstiva, 34, 105.
æstiva æstiva, 23, 78, 83, 376, 475, 524.
æstiva hooveri, 265.
auduboni, 230.
auduboni auduboni, 335.
cærulescens, 229.
cærulescens cærulescens, 23, 321, 475, 524.
cærulescens cairnsi, 373, 376.
castanea, 23, 78.
cerulea, 524.
coronata, 23, 37, 73, 78, 230, 324, 524.
discolor, 83, 377, 524.
fusca, 322, 373, 376, 476, 524.
kirtlandi, 72.
magnolia, 23, 78, 322, 475, 524.
palmarum hypochrysea, 78, 524.
palmarum palmarun, 247.
pensylvanica, 78, 324, 373, 376, 476, 524.
striata, 78, 524.
tigrina, 251, 423, 545.
townsendi, 400.
vigorsi, 83, 476, 524.
virens, 23, 78, 323, 373, 375, 476, 524.
Dicaeum formosum, 555.
sumatranum batuense, 552.
Dickcissel, 33, 544.
Dill, Homer R. and Wm. A. Bryan, review of their 'Report on an Expedition to Laysan Island, in 1911,' 412.

Diomedea culminata mathewsi, 422.
exulans, 46.
immutabilis, 412.
nigra, 412.
Dionne, C. E., abundance of the Cape May Warbler (*Dendroica tigrina*) in Quebec, 545.
Diver, Red-throated, 558.
Dolichonyx oryzivorus, 21, 43, 323, 478, 519.
Dove, Mourning, 19, 28, 80, 120, 332, 376, 469, 515.
West Indian White-winged, 381.
Western Mourning, 381.
White-winged, 381.
Dovekie, 399.
Dowitcher, 513.
Long-billed, 42.
Dryobates borealis, 112.
medius transcaucasicus, 424.
pubescens, 28.
pubescens glacialis, 386.
pubescens medianus, 76, 324, 376, 471, 517.
pubescens pubescens, 81.
scalaris bairdi, 383.
scalaris cactophilus, 383.
scalaris eremicus, 383.
scalaris lucasanus, 383.
scalaris symplectus, 241, 386.
villosus, 28.
villosus auduboni, 81.
villosus hyloscopus, 383.
villosus icastus, 385.
villosus leucothorectis, 332, 383.
villosus orius, 385.
villosus sitkensis, 118, 386.
villosus terrænovæ, 76.
villosus villosus, 20, 375, 471, 517.
Duck, Abert's, 305.
Australian, 534.
Baldpate, see Baldpate.
Black, 19, 42, 176–179, 234, 299, 442, 511, 533.
Duck, Bufflehead, see Bufflehead.
Canvas-back, see Canvas-back.
Eider, see Eider.
Florida, 297.
Hawaiian, 301.
Labrador, 389.
Lesser Scaup, 39, 371, 375, 512.
Mallard, see Mallard.
Mottled, 297.
Old-squaw, see Old-squaw.
Pintail, 201, 235, (see also Pintail).
Redhead, see Redhead.
Ring-necked, 512, (see also Ring-neck).
Ruddy, 39, 512.
Scaup, 39, 443.
Steamer, 418.
Texan, 297.
Wood, 39, 80, 512.
Dugés, Alfredo, biographical notice of, 434.
Dumetella carolinensis, 34, 83, 106, 249, 376, 476, 525.
Dyke, Arthur C., records from Nippinickett pond, Bridgewater, Mass., 536.

Eagle, Bald, 20, 43, 254, 372, 375, 393, 516.
Golden, 43, 102, 254, 255, 332, 516.
Economic Ornithology in Recent Entomological Publications, 416.
Ectopistes marginella, 381.
migratorius, 169, 175, 238, 514, 539.
Ecuador, birds of, 138, 141–149.
Egret, 100, 236.
Great White, 42.
Snowy, 42, 237, 277, 331.
Egretta candidissima, 42.
candidissima candidissima, 237, 331.
Eider, 75.
Northern, 535.
Elanoides forficatus, 239.

Emberiza, 384.
citrinella, 558.
rustica, 384.
Empidonax, 229.
acadicus, 376.
griseus, 549.
flaviventris, 21, 518.
minimus, 41, 77, 81, 319, 372, 376, 473, 518.
trailli alnorum 21, 77, 111, 315.
virescens, 32, 81, 473, 518.
wrighti, 549.
'Emu,' review of, 271, 423, 556.
England, birds of, 187, 190, 272, 406, 407.
Eremophila, 410.
Ereunetes pusillus, 101, 238, 252.
Erismatura jamaicensis, 39, 512.
Euchlornis aureipectus festiva, 419.
Erythrocercus nyasæ, 555.
Eudyptula minor iredalia, 124.
Euphonia aurea, 208.
chlorotica, 208.
Euphagus carolinus, 43, 77, 202, 395, 520.
cyanocephalus, 41, 333.

Falco æsalon, 410.
columbarius, 43.
columbarius columbarius, 76, 516, 541.
columbarius richardsoni, 72.
mexicanus, 40.
peregrinus anatum, 102, 516.
rusticolus rusticolus, 239.
sparverius, 35.
sparverius phalæna, 332.
sparverius sparverius, 80, 376, 470, 516.
Falcon, Prairie, 40.
Fay, S. Prescott, Yellow Rail (*Coturnicops noveboracensis*) in Massachusetts, 237.
Feild, Alexander L., see Bruner, Stephen C.
Fiji Islands, birds of the, 422.
Finch, House, 333.
Finch, Laysan, 166–168, 341.
Purple, 21, 245, 255, 322, 325, 520.
Fleming, J. H., the Ancient Murrelet (*Synthliboramphus antiquus*) in Ontario 387–388; Sabine's Gull on the Mississippi River, 388; the Niagara Swan trap, 445–448; review of his 'A New Teal from the Audaman Islands,' 119;
Flicker, 81, 202, 376.
Gilded, 383.
Mearns's Gilded, 384.
Northern, 20, 28, 76, 324, 472, 518.
Red-shafted, 36, 332.
San Fernando, 383.
Florence, Laura, notice of her 'The Food of Birds in Scotland,' 417.
Florida, birds of, 344.
Florida cærulea, 42, 513.
Flycatcher, Acadian, 32, 81, 376, 473, 518.
Alder, 21, 77, 111, 315, 325.
Crested, 32, 81, 242, 324, 325, 377, 472, 518.
Least, 41, 77, 81, 319, 372, 376, 473, 518.
Olive-sided, 21, 121, 324.
Scissor-tailed, 32.
Yellow-bellied, 21, 518.
Forbush, E. H., review of his 'The Starling in America,' 114–115.
France, birds of, 183.
Francolinus bottegi, 555.
casteneicollis, 555.
gofanus, 555.
lathami schubotzi, 425.
Fregata aquila, 531.
Fregetta grallaria, 550.
leucogaster, 550.
mœstissima, 550.
tubulata, 550.
Fregettornis, 550.
Fringilla canaria, 339–342.
Fringillaria kovacsi, 424.

Fulica americana, 31, 513.
Fulmar, Slender-billed, 45.

Gadwall, 38.
Galapagos, birds of, 233.
Galerida thecklæ polatzeki, 424.
thecklæ hilgerti, 426.
Gallinago delicata, 40, 73, 75, 513.
nobilis, 143.
Gallinula galeata, 42, 513.
Gallinule, Florida, 42, 513.
Garrulus glandarius corsicanus, 425.
Gavia immer, 42, 75, 201, 510.
Gentry, Thomas G., review of his 'Life-Histories of the Birds of Eastern Pennsylvania,' 119–121.
Georgia, birds of, 103, 105, 531.
Geothlypis trichas occidentalis, 34.
trichas scirpicola, 265.
trichas trichas, 23, 78, 83, 321, 376, 476, 525.
Georgia, birds of, 103, 105.
Germany, birds of, 271, 425.
Gladstone, Hugh S., letter on Sir William Jardine, 278; notice of his 'A Catalogue of the Vertebrate Fauna of Dumfriesshire,' 553.
Glaucidium gnoma gnoma, 382.
gnoma pinicola, 382, 399.
Gnatcatcher, Blue-gray, 41, 84, 526, 546.
Western, 335.
Godwit, Hudsonian, 112.
Marbled, 72, 108, 252.
Golden-eye, 42, 75, 444, 544.
Goldfinch, 21, 29, 82, 322, 325, 377, 474, 520.
Arkansas, 333.
Pale, 333.
Goldman, E. A., review of his 'A New Kingfisher from Panama,' 261; notice of his expedition to Panama, 138.
Goose, American White-fronted, 201.
Goose, Blue, 39.
Canada, 39, 75, 390, 391, 512.
Hutchin's, 39, 536.
Lesser Snow, 39.
Snow, 201.
White-fronted, 39.
Goshawk, 76, 110, 515.
Grackle, Bronzed, 21, 29, 82, 110, 394, 474, 520.
Purple, 293, 473, 520, (see also Blackbird, Crow.)
Grallaria monticola, 144.
Great Slave Lake, birds of, 198–204.
Grebe, Eared, 42.
Holbœll's, 233, 439.
Horned, 441, 510.
Pied-billed, 37, 441, 510.
Western, 42.
Greenland, birds of, 109.
Grinnell, J., a name for the Hawaiian Linnet, 24–25; concerning the Hawaiian Linnet, 543; the functions of the A. O. U. Committee on Nomenclature, 561; review of his 'Systematic List of the Birds of California,' 551.
Griscom, Ludlow, the Connecticut Warbler in Central Park, New York City, 396; see also Johnson, Julius M.
Grönberger, S. M., two new birds for Greenland, 109.
Grosbeak, Black-headed, 459.
Blue, 43, 82.
Pine, 77.
Rocky Mountain Pine, 333.
Rose-breasted, 33, 324, 373, 375, 461, 478, 522.
Western Evening, 43, 113.
Gross, Alfred O., observations on the Yellow-billed Tropic-bird (*Phaëthon americanus* Grant) at the Bermuda Islands, 49–71.
Grouse, Canadian Ruffed, 19, 324.
Columbian Sharp-tailed, 238, 398.

Grouse Richardson's, 252.
Ruffed, 80, 371, 375, 378, 469, 514, 542.
Grus, 410.
americana, 40.
canadensis, 40.
mexicana, 40.
Guillemot, Black, 75.
Guiraca cærulea, 43.
cærulea cærulea, 82.
Guinea Fowl, Crested, 208.
Gull, Black-backed, 100, 544.
Black-headed, 85, 100.
Bonaparte's, 510.
Forked-tailed, 233.
Franklin's, 38, 99, 388, 510.
Glaucous, 75.
Great Black-backed, 75.
Herring, 19, 37, 75, 85, 201, 442, 544.
Laughing, 99, 531, 538.
Lesser Black-backed, 85.
Mew, 85.
Ring-billed, 38, 510.
Sabine's, 388.
Gulls, flight of, 85–92.
Gunning, J. W. B., and Austin Roberts, review of their 'New Records and Descriptions of New Species of Birds in the Transvaal Museum Collection,' 267.
Guttera **pallasi**, 208.
plumifera schubotzi, 425.
Gygis alba, 556.
Gyrfalcon, Gray, 239.

Hagedashia, 552.
Haliæetus leucocephalus, 43.
leucocephalus leucocephalus, 20, 254, 372, 375, 516.
Hapalopteron familiare, 250.
Harelda, 410.
Harelda hyemalis, 42.
Harlow, Richard C., the Louisiana Water-Thrush and Broad-winged Hawk in southern New Jersey, 115; the breeding birds of southern Center county, Pennsylvania, 465–478.
Hartert, Ernst, review of his 'Vögel der paläarktischen Fauna,' Bd. II, 1, 407.
Hartert, Ernst, F. C. R. Jourdain, N. F. Ticehurst, and H. F. Witherby, review of their 'Handlist of British Birds,' 407.
Hawk, Broad-winged, 19, 72, 105, 470, 516.
Cooper's, 40, 80, 375, 470.
Desert Sparrow, 332.
Duck, 80, 102, 109, 516.
Krider's, 31.
Marsh, 19, 35, 332, 477, 515.
Pigeon, 43, 76, 516, 541.
Red-shouldered, 40, 80, 375, 477, 516.
Red-tailed, 19, 35, 376, 470, 515.
Richardson's Pigeon, 72.
Rough-legged, 120, 399.
Sharp-shinned, 19, 43, 72, 80, 332, 477, 515.
Sparrow, 35, 80, 149, 376, 470, 516.
Swainson's, 35.
Texas, Red-shoudered, 232–233.
Western Red-tailed, 332.
Hawaiian Islands, birds of, 24, 336, 339, 543.
Headley, F. W., review of his 'The Flight of Birds,' 106.
Helionympha raineyi, 261.
Hellmayr, C. E., review of his 'Contribution to the Ornithology of Western Colombia,' 268.
Helmitherus vermivorus, 523.
Helmuth, William Tod, Jr., Cory's Shearwater in abundance off Long Island, 234.
Helodromas, 409.
Helodromas solitarius, 40.

Helodromus solitarius solitarius, 514.
Hemispingus, 268.
Hen, Prairie, 28.
Henderson, Junius, remarks on Sclater's 'A History of the Birds of Colorado,' 277–278; Sclater's Contour Map of Colorado, 429.
Henshaw, Henry W., Cooke's 'Distribution and Migration of North American Shorebirds,' 128–131; review of his 'Report of the Chief of the Bureau of Biological Survey for 1911,' 263.
Herodias egretta, 42, 236.
Heron, Black-crowned Night, 42, 513.
Great Blue, 19, 39, 321, 375, 477, 512.
Green, 30, 80, 377, 468, 513.
Little Blue, 42, 513.
Yellow-crowned Night, 254.
Herrick, Francis H., review of his 'Nests and Nest-Building in Birds,' 262.
Hesperiphona vespertina montana, 43.
Heteroprion, 550.
belcheri, 550.
desolatus alter, 550.
desolatus macquariensis, 550.
desolatus mattingleyi, 550.
desolatus perrugneyi, 550.
Highhole, 255.
Hill-star, 146.
Himantopus mexicanus, 72.
Hirundo, 410.
albifrons, 193.
erythrogastra, 22, 34, 83, 265, 315, 335, 396, 475, 522.
Hoatzin, 285.
Hodge, C. F., a last word on the Passenger Pigeon, 169–175.
Holland, birds of, 116, 420, 423.
Hollister, N., some erroneous Wisconsin bird records, 397.
Horeites acanthizoides concolor, 555.
Horsbrugh, Boyd, review of his 'Game-Birds and Water-Fowl of South Africa,' 410, 553.
Howell, Arthur H., review of his 'Birds of Arkansas,' 259.
Howard, H. Eliot, review of his 'British Warblers'—Part 6, 406.
Hummingbird, Allen's, 253.
Ruby-throated, 21, 32, 81, 120, 324, 376, 472, 518.
Hydrobates, 409.
Hydrochelidon nigra surinamensis, 38, 198, 511.
Hylocichla, 160–161.
fuscescens fuscescens, 23, 79, 84, 317, 374, 375, 477, 526.
guttata, 455.
guttata auduboni, 336.
guttata nanus, 336.
guttata pallasi, 23, 79, 250, 316, 527.
mustelina, 35, 84, 318, 377, 477, 526.
ustulata, 455.
ustulata swainsoni, 23, 41, 318, 526.
Hypocentor rustica, 261.
Hypocnemis nævia ochracea, 424.

Ibis, White-faced Glossy, 42.
'Ibis,' review of, 270, 421, 554.
Ibycter carunculatus, 148.
Icteria virens, 34.
virens virens, 83, 377, 476, 525.
Icterus galbula, 33, 82, 244, 473, 520.
spurius, 32, 82, 400, 473, 520.
Ictinia mississippiensis, 43, 239.
Idaho, birds of, 106, 247, 538.
Illinois, birds of, 109, 356, 388, 421.
India, birds of, 413.
Indiana, birds of, 172, 194, 196, 239.
Iowa, birds of, 240.
Iridophanes, 268.

Iridoprocne bicolor, 22, 34, 78, 478, 522.
Isley, Dwight, a list of the birds of Sedgwick County, Kansas, 25–44.
Italy, birds of, 180–183, 185, 188, 268, 270, 422.
Ithaginus cruentus affinis, 553.
kuseri, 553.
Ixobrychus exilis, 30, 100, 399.
Ixos familiaris, 250.
Iynx thorbeckei, 557.
torquilla sarudnyi, 424.

Jackson, Thomas H., Starling in Chester Co., Pa., 243.
Jacobs, J. Warren, review of his 'The American Bird House Journal,' 266.
Jardine, Sir William, Announcement of proposed life of, 278.
Jay, Blue, 21, 32, 82, 324, 377, 473, 519.
Canada, 412.
Labrador, 77.
Long-crested, 333.
Pinon, 110, 333.
Woodhouse's, 333.
Jewett, Stanley G., another Saw-whet Owl from Oregon, 102; western records of the Catbird (*Dumetella carolinensis*), 106; notes from New Brunswick, 251.
Johnson, Julius M. and Ludlow Griscom; the Brown Pelican on Long Island, 389.
Jourdain, F. C. R., see Hartert, E.
'Journal für Ornithologie,' review of, 271, 425, 557.
'Journal of the South African Ornithologists' Union,' review of, 557.
Junco, Carolina, 372, 375, 521.
Gray-headed, 277.
Pink-sided, 334.
Red-backed, 335.
Ridgway's, 335.
Shufeldt's, 43, 334.
Junco, Slate-colored, 22, 36, 72, 77, 319, 478, 521.
Junco hyemalis, 36.
hyemalis annectens, 335.
hyemalis carolinensis, 372, 375, 521.
hyemalis connectens, 43, 334.
hyemalis hyemalis, 22, 72, 77, 319, 478, 521.
hyemalis mearnsi, 334.
hyemalis oregonus, 265.
phæonotus dorsalis, 335.

Kansas, birds of, 25–44, 360.
Kellogg, Louise, review of her 'Winter Birds from Trinity and Shasta Counties, California,' 118.
Kennard, Fred. H., a peculiar plumage of the Canada Goose (*Branta canadensis canadensis*), 391.
Kennedy, Clarence H., further notes on the fruit-eating habits of the Sage Thrasher in the Yakima Valley, Washington, 224–226.
Kentucky, birds of, 192, 196, 401, 352.
Keulemans, John Gerrard, obituary notice of, 571.
Killdeer, 31, 72, 80, 331, 469, 514, 537.
Kingbird, 21, 32, 76, 81, 317, 376, 472, 518.
Kingfisher, Belted, 20, 31, 76, 81, 324, 332, 376, 471, 517.
Northwestern Belted, 382.
Kinglet, Golden-crowned, 23, 374, 375, 526.
Ruby-crowned, 73, 78, 335, 526.
Kite, Mississippi, 43, 239.
Swallow-tailed, 239.
Knipolegus orenocensis xinguensis, 424.
Kobbe, Frederick Wm., Shore-bird notes, 108.
Korea, birds of, 138.

Kuser, John Dryden, Egret in Northern New Jersey, 100; review of his 'The Birds of Somerset Hills,' 418.

Labrador, 129, 263.
Lacey, Howard, additions to birds of Kerrville, Texas, 254.
Lagopus lagopus albus, 117.
lagopus alexandræ, 117.
lagopus brevirostris, 557.
lagopus lagopus, 202.
lagopus ungavus, 117, 381.
leucurus leucurus, 202.
rupestris rupestris, 202.
rupestris sanfordi, 260.
welchi, 73, 76.
Lamb, Chas. R., Greenland Wheatear seen in Massachusetts, 250.
Lampribis, 552.
Laniarius funebris degener, 426.
funebris atrocæruleus, 426.
Lanius borealis, 37.
ludovicianus excubitorides, 34.
ludovicianus ludovicianus, 523.
ludovicianus migrans, 478.
Lanivireo flavifrons, 83, 475, 523.
solitarius alticola, 373, 376.
solitarius solitarius, 22, 321, 523.
Lano, Albert, White-winged Scoter in Minnesota, 236; Gray Gyrfalcon (*Falco rusticolus rusticolus*) in Minnesota, 239; Painted Bunting in Minnesota, 247; Caspian Tern (*Sterna caspia*) in Minnesota, 389.
Lark, Desert Horned, 36.
Horned, 544.
Prairie Horned, 324, 412, 473, 518.
Shore, 202.
Larus argentatus, 19, 37, 75, 201, 442.
atricilla, 99, 531.
fuscus brittanicus, 555.
Larus delawarensis, 38, 510.
franklini, 38, 99, 388, 510.
hyperboreus, 75, 410.
marginatus, 196.
marinus, 75, 100.
philadelphia, 197, 510.
ridibundus, 572.
Laysan, birds of, 166, 412.
Lechner, A. A. Van Pelt, review of his 'Oologia Neerlandica,' 116, 420.
Limicolæ, 130.
Limosa fedoa, 72, 252.
Limosa hæmastica, 112.
Lincoln, F. C., notes on the Dickcissel in Colorado, 544.
Linnet, Hawaiian, 336–338, 543.
Lobipes lobatus, 400.
Longspur, Chestnut-collared, 398.
Lapland, 111, 204, 246.
Lophodytes cucullatus, 38, 511.
Lophortyx gambeli, 331.
Lophotibis, 552.
Loon, 42, 75, 201, 510.
Louisiana, birds of, 348.
Loxia curvirostra minor, 21, 77, 245, 265, 333, 520.
leucoptera, 21, 43, 202.
Lowe, Percy R., review of his 'A Naturalist on Desert Islands,' 116.

McAtee, W. L., certain phases of the theory of recognition marks, 226–232; review of his 'Woodpeckers in Relation to Trees and Wood Products,' 114; methods of estimating the contents of bird stomachs, 449–464; review of his 'Bird Enemies of the Codling Moth,' 413.
McAtee, W. L., and F. E. L. Beal, review of their 'Some Common Game, Aquatic and Rapacious Birds in Relation to Man,' 413.
McGregor, Richard C., notice of

his 'Record of a Puffinus new to Philippine Waters,' 267.
Machetornis rixosa flavigularis, 419.
Macronectes giganteus forsteri, 550.
giganteus halli, 550.
giganteus solanderi, 550.
giganteus wilsoni, 550.
Macrorhamphus griseus, griseus, 513, 400.
griseus scolopaceus, 400.
scolopaceus, 42.
Magdalen Islands, birds of the, 112, 209–223.
Maine, birds of, 106, 174, 235, 236, 245, 283, 532, 536, 546.
Maine Ornithological Society, discontinuance of Journal, 283.
Mallard, 38, 108, 511, 533.
Manikup, 257.
Man-o'-war-bird, 531.
Mantellornis, 124.
Mareca, 409.
americana, 38, 511.
penelope, 235, 536.
Marila, 132, 409.
affinis, 39, 371, 375, 512.
americana, 39, 442, 512.
collaris, 39, 512.
marila, 39, 443.
valisineria, 39, 442, 512.
Martin, Purple, 22, 33, 83, 277, 474, 522.
Marx, Edward J. F., Hooded Warbler (*Wilsonia citrina*) at the Delaware Water Gap, Pa., 249; Hermit Thrush wintering at Easton, Pa., 250.
Maryland, birds of, 346.
Mason, C. W., review of his 'The Food of Birds in India,' 413.
Massachusetts, birds of, 99, 237, 242, 243, 247, 249, 250, 390, 391, 394, 395, 420, 531, 533–537, 541, 543, 546.
Mathews, Gregory M., 'Mathews' Notes on Nomenclature,' 131–133; review of his 'Birds of Australia,' 124–125, 549; review of his 'The Austral Avian Record' No. 1, 266; No. 2, 411; No. 3, 551.
Mavis, 255.
Meadowlark, 29, 82, 376, 412, 473, 519.
Western, 29, 333.
Mearns, Edgar A., notice of his trip to Abyssinia and Lake Rudolf, 139; review of his 'Seven new Grass-warblers of the genus Cisticola,' and 'A New species of Sun Bird, *Helionympha raineyi*, from British East Africa,' 261.
Mearnsia, 257.
Megalornis, 410.
Megascops asio, 28.
Melanerpes erythrocephalus, 20, 31, 81, 241, 472, 517, 541.
formicivorus formicivorus, 332.
Meleagris cristata, 208.
gallopavo merriami, 331.
gallopavo silvestris, 28, 80, 469, 514.
Melopelia asiatica asiatica, 381.
asiatica trudeaui, 381.
Melospiza cinerea melodia, 372, 376.
cinerea rufina, 253.
georgiana, 22, 77, 112, 478, 522.
lincolni lincolni, 77, 521.
melodia, 36.
melodia, inexpectata, 117, 386.
melodia melodia, 22, 82, 313, 474, 521.
melodia merrilli, 387.
melodia montana, 400.
melodia morphna, 118, 265, 387.
Merganser, 75, 442.
American, 38, 110.
Hooded, 38, 511.
Red-breasted, 38, 479–488.
Merganser americanus, 38.
Merganser serrator, 38.

Mergus americanus, 75, 110, 442.
serrator, 479–488, (see also Merganser).
Meridan Bird Club, review of its report for 1911, 118.
Merrill, D. E., Sora Rail (*Porzana carolina*) in New Mexico, 536.
Mesopicus schultzei, 424.
'Messager Ornithologique,' review of, 425.
Michigan, birds of, 100, 102, 107, 118, 171–3, 237, 547.
Micranous worcesteri, 267.
Micropalama himantopus, 112, 252.
Miller, Richard F., the Semipalmated Sandpiper in Philadelphia County, Pa., 101; occurrence of the Yellow-headed Blackbird on the Delaware River near Philadelphia, Pa., 102.
Miller, W. DeW., The European Widgeon at Gardner's Island, New York, 235.
Mimus polyglottos, 29.
polyglottos polyglottos, 83, 525.
Missouri, birds of, 102, 344.
Mitchell, Julian, Jr., Pigeon Hawk in South Carolina, in winter, 541.
Mniotilta varia, 22, 78, 83, 322, 377, 475, 523.
Mockingbird, 29, 83, 249, 525.
Molothrus ater, 32.
ater artemisiæ, 386.
ater ater, 82, 110, 473, 519.
ater dwighti, 386.
Monasa fidelis, 261.
similis, 261.
Moore, Robert Thomas, the Least Sandpiper during the nesting season in the Magdalen islands, 210–223: the Bittern (*Botaurus lentiginosus*), wintering in New Jersey, 236; last record of the Piping Plover in New Jersey, 238; the Baltimore Oriole (*Icterus galbula*) wintering in New Jersey, 244.
Morris, Robert O., King Rail (*Rallus elegans*) at Springfield, Mass., 237; the Starling at Springfield, Mass., 243.
Morse, Albert P., review of his 'A Pocket List of the Birds of Eastern Massachusetts,' 420.
Motacilla ruficapilla, 545.
Murphey, Robert Cushman, an albino Semipalmated Sandpiper, 238; notice of his 'Birds of Prospect Park, Brooklyn,' 418.
Murrelet, Ancient, 387.
Muscadionus consobrina babiensis, 552.
Muscisaxicola alpina, 148.
Muscivora forficata, 32.
Museum of Vertebrate Zoology of the University of California, field trips, 137.
Myadestes townsendi, 37, 335.
Myiarchus crinitus, 32, 81, 242, 377, 472, 518.
Myiobius modestus, 419.
Myiochanes ardosiacus polioptilus, 419.
virens, 21, 32, 81, 316, 376, 472, 518.
Myiodynastes chrysocephalus cinerascens, 419.
Myiotheretes erythropygius, 145.
Myrmornis, 257.
Myrmotherula surinamensis pacifica, 268.

Nannus hiemalis hiemalis, 23, 78, 373, 375, 526.
National Association of Audubon Societies, Annual reports of, 139.
Nelson, E. W., review of his 'Descriptions of two new Species of Nun Birds from Panama,' 261.
Neochalcites, 266.

Neositta mortoni, 271.
Nephœcetes niger borealis, 241, 257.
Nesofregetta, 550.
Netta, 409.
Nettion, 409.
carolinense, 38, 331, 511.
crecca, 535.
Nevada, birds of, 264.
New Brunswick, birds of, 16–23, 112, 210–223, 251.
New Guinea, expedition to, 573.
New Hampshire, birds of, 307–327, 411.
New Jersey, birds of, 100, 105, 236, 238, 418, 421, 532.
New Mexico, birds of, 237, 327–336, 536.
New York, birds of, 100, 105, 108, 234, 235, 238, 239, 389, 418, 532.
New Zealand, birds of, 271, 423.
Newfoundland, birds of, 72–79.
Nichols, John Treadwell, notes on recognition marks in certain species of birds, 44, see also p. 226.
Nighthawk, 20, 32, 121, 324, 472, 518.
Nightingale, Greater Kamchatkan, 385.
Ninox strenua, 556.
Nomina conservanda, 432–434.
North Carolina, birds of, 108, 346, 368–377, 531, 533, 538.
North Dakota, birds of, 539.
Norton, Arthur H., the Pintail Duck (*Dafila acuta*) — in winter near Portland, Maine, 235; early occurrence of the White-rumped Sandpiper (*Pisobia fuscicollis*) in Maine, 536.
'Notes from the Leyden Museum,' review of, 426.
Notornis hœckstetteri, 124.
Nova Scotia, birds of, 378, 523.
'Novitates Zoologicæ,' review of, 426.
Nucifraga columbiana, 333.
Numenius borealis, 398.
hudsonicus, 40.
longirostris, 40.
phaeopus, 558.
Numida cristata, 208.
Nutcracker, Clark's, 333.
Nuthatch, Brown-headed, 84.
Pygmy, 335.
Red-breasted, 23, 78, 324, 335, 374, 412, 526.
Rocky Mountain, 335.
Slender-billed, 111.
White-breasted, 37, 84, 324, 375, 476, 526.
Nuttallornis borealis, 21.
Nyctea nyctea, 43, 110.
Nycticorax nycticorax nævius, 42, 513.
Nyctinassa violacea, 254.
Nyroca, 132, 409.

Oates, Eugene William, biographical notice of, 434.
Oberholser, H. C., review of his 'Revision of the Edible-Nest Swiftlets,' 411.
Oceanites nereis chubbi, 550.
nereis couesi, 550.
oceanicus exasperatus, 550.
Oceanodroma leucorhoa, 75.
tristrami, 412.
Ochthodromus wilsonius, 392.
Œnanthe, 133, 396, 409.
Ohio, birds of, 196, 421.
Oidemia deglandi, 236.
perspicillata, 42, 201.
Oklahoma, birds of, 344.
Old-squaw, 42.
Oliver, W. R. B., review of his 'Geographic Relationships of the Birds of Lord Howe, Norfolk and the Kermadec Islands,' 553.
Olor columbianus, 39, 445–448.
Ontario, birds of, 345, 387, 397.
Oprorornis agilis, 396.
formosus, 377.
Oregon, birds of, 102, 106, 253.

Oreoibis, 552.
akleyorum, 552.
Oreortyx, 253.
picta confinis, 549.
picta plumifera, 538, 549.
Oreoscoptes montanus, 224–226.
Oreospiza chlorura, 255, 335.
Oreotrochilus chimborazo, 147.
pichincha, 146.
Oriole, Baltimore, 33, 82, 244, 473, 520.
Orchard, 32, 82, 473, 520.
Ornithological Journals, reviews of, 270–272, 420–426, 554–559.
'Ornithologische Monatsberichte,' 424, 557.
'Ornithologische Monatsschrift,' review of, 425, 558.
'Ornithologisches Jahrbuch,' review of, 425, 558.
Osprey, 43, 76, 393, 517.
Otocoris alpestris hoyti, 202.
alpestris leucolæma, 36.
alpestris praticola, 473, 518.
Otus asio asio, 81, 376, 471, 517, (see also Megascops).
asio cineraceus, 382.
asio gilmani, 382.
flammeolus flammeolus, 332.
Ousel, Water, 335.
Oven-bird, 23, 43, 83, 111, 318, 325, 377, 476, 524.
Owenavis, 266.
Owl, Barn, 31, 81, 517.
Barred, 40, 81, 478, 517.
Burrowing, 28.
Flammulated Screech, 332.
Great Gray, 397.
Great Horned, 81, 156, 240, 471, 517.
Hawk, 120.
Long-eared, 40, 255, 477.
Rocky Mountain Pygmy, 382, 399.
Sahuara Screech, 382.
Saw-whet, 102, 239, 517.
Owl, Screech, 28, 81, 158, 376, 471, 517.
Short-eared, 40, 110, 277, 517.
Snowy, 43, 110.
Western Horned, 332.
Oxyechus vociferus, 31, 72, 80, 331, 469, 514, 537.
Oystercatcher, 538.

Pagodroma confusa, 550.
Pagophila alba, 410.
Palmer, T. S., the Man-o'-War-bird (*Fregata aquila*) on the coast of Georgia, 531.
Panama, birds of, 138, 261.
Pandion haliaëtus carolinensis, 43, 76, 517.
Parkins, Thomas, review of his 'Record of Sales of the Great Auk,' 266.
Paroquet, Carolina, 343–363, 559.
Partridge, Crater, 148.
Spruce, 412.
Parus ater ptilosus, 555.
aureus, 208.
cinereus ferghanensis, 425.
Passer domesticus, 21, 29, 82, 334, 377.
Passerculus sandwichensis alaudinus, 265, 384.
sandwichensis nevadensis, 384.
sandwichensis savanna, 21, 72, 73, 77, 316, 474, 521.
Passerella iliaca, 41.
iliaca altivagans, 117, 386.
iliaca iliaca 73, 74, 77, 522.
iliaca sinuosa, 386.
Passerherbulus henslowi henslowi, 82.
lecontei, 33, 72.
maritimus macgillivraii, 104.
maritimus maritimus, 103.
nelsoni nelsoni, 72, 521.
nelsoni subvirgatus, 21, 251.
Passerina cyanea, 33, 82, 111, 321, 377, 474, 522.

Passerina ciris, 43, 247.
ciris pallidior, 386.
Patagonia, birds of, 417.
Pediœcetes phasianellus campestris, 238.
phasianellus columbianus, 238.
Pelagodroma marina dulciæ, 550.
marina howei, 550.
marima maoriana, 550.
Pelecanus erythrorhynchos, 38, 254.
occidentalis, 42, 389.
Pelican, Brown, 42, 389, 531.
White, 38, 254.
Pelidna alpina sakhalina, 391.
Penelope colombiana, 419.
Penguin, King, 559.
Penguinus, 124.
Pennock, C. J., nesting of the Passenger Pigeon (*Ectopistes migratorius*) in New York, 238; Crossbills (*Loxia curvirostra minor*) in Chester Co., Pa., in summer, 245; Lapland Longspur (*Calcarius lapponicus lapponicus*) in Delaware, 246; Lawrence's Warbler (*Vermivora lawrencei*) in Chester County, Pa., 247.
Pennsylvania, birds of, 99, 101, 102, 103, 119, 243, 245, 247, 249, 250, 269, 465–478.
Penthestes atricapillus atricapillus, 23, 30, 78, 230, 319, 374, 375, 477.
atricapillus septentrionalis, 399.
carolinensis, 230.
carolinensis carolinensis, 84, 377, 526.
gambeli gambeli, 335.
hudsonicus hudsonicus, 23.
rufescens rufescens, 384.
rufescens vivax, 385.
Perisoreus canadensis nigricapillus, 77.
Peru, birds of, 283, 425.
Petrel, Black-capped, 511.
Bulwer's, 412.
Petrel, Leach's 75.
Sooty, 412.
Wilson's, 538.
Petrochelidon lunifrons, 34,204, 396.
lunifrons lunifrons, 22, 83, 335.
Petronia superciliaris bororensis, 557.
Peucæa æstivalis bachmani, 111, 376, 521.
cassini, 41.
Pewee, Wood, 21, 32, 81, 316, 325, 376, 472, 518.
Phaëthon demersus, 124.
americanus, 49.
Phætusa magnirostris, 100.
Phalacrocorax auritus, 42.
auritus auritus, 19.
Phalænoptilus nuttalli nitidus, 332.
Phalarope, Northern, 128.
Wilson's, 42, 72, 108.
Phalaropus hyperboreus, 128.
Pheasant, Mikado, 555.
Pheugopedius macrurus annectens, 419.
Philippine Islands, birds of, 267.
Phillips, Charles L., the Acadian Sharp-tailed Sparrow and other birds at Plymouth, Mass., 543.
Phillips, John C., a reconsideration of the American Black Ducks with special reference to certain variations 295–306; the Hawaiian Linnet, *Carpodacus mutans*, Grinnell, 336–338; Massachusetts Geese, 390; Rusty Blackbird (*Euphagus carolinus*) wintering in Essex Co., Mass., 395; Mallard and Black Ducks at Currituck, N. C., 533; dispersal of the Australian Duck (*Anas superciliosa*) 534; the European Teal (*Nettion crecca*) again returning to Wenham, Mass., 535; see also Barbour, Thomas.
Philohela minor, 19, 42, 72, 80, 469, 513.

Phlœotomus pileatus abieticola, 251, 323, 471, 517.
pileatus floridanus, 386.
pileatus picinus, 386.
pileatus pileatus, 81.
scapularis, 241.
Phœbe, 32, 81, 316, 325, 333, 372, 376, 472, 518.
Phrygilus unicolor, 142.
Piaya rutila panamensis, 419.
Picoides americanus dorsalis, 400.
arcticus, 76.
Pigeon, Band-tailed, 331, 392, 539, 540.
Cape, 45.
Passenger, 169–175, 238, 514, 539.
Wood, 186.
Pinicola enucleator flammula, 265.
enucleator leucura, 77.
enucleator montana, 333.
Pintail, 39, 511.
Pipilo erythrophthalmus, 33.
erythrophthalmus erythrophthalmus, 82, 376, 474, 521.
fuscus mesoleucus, 335.
maculatus curtatus, 386.
maculatus montanus, 335.
Pipit, 525,
American, 37.
Sprague's, 72.
Piranga erythromelas, 33, 83, 373, 377, 474, 522.
ludoviciana, 111, 255.
rubra rubra, 83.
Pisobia fuscicollis, 536.
maculata, 40, 513.
minutilla, 40, 73, 76, 210–223, 514.
Pitta habenichti, 557.
Planesticus migratorius, 30.
migratorius migratorius, 23, 79, 84, 204, 314, 375, 477, 527.
migratorius propinquus, 111, 336.
Platyrhynchus griseiceps amazonicus, 424.
Plautus impennis, 208.
Plectrophenax nivalis, 43.
nivalis nivalis, 111, 202.
Plegadis guarauna, 42.
Ploceus anochlorus, 425.
melanolæma, 424.
Plover, American Golden, 43.
Black-bellied, 43.
Golden, 101.
Piping, 46, 72, 222, 238.
Ring-neck, 46, 222.
Semipalmated, 514.
Upland, 31, 72, 254, 277, 514.
Wilson's, 392.
Podiceps, 124, 132, 133.
cristatus christiani, 124.
griseigena, 385.
Podilymbus podiceps, 37, 441, 510.
Pœcile barcalensis suschkini, 424.
Poicephalus meyeri matschiei, 424.
Polionetta albigularis leucopareus, 118.
Polioptila cærulea, 41.
cærulea cærulea, 84, 526, 546.
cærulea obscura, 335.
melanura, 549.
Poliospiza dimidiata, 424.
Pœcetes gramineus, 41.
gramineus confinus, 333.
gramineus gramineus, 21, 82, 316, 474, 521.
Poor-will, Frosted, 332.
Popelairia conversii salvini, 257.
Porphyrio cæruleus, 555.
melanotis fletcheræ, 124.
melanotis neomelanotus, 124.
Porto Rica, birds of, 138.
Porzana carolina, 31, 474, 522, 536.
jamaicensis, 398.
Porzanula palmeri, 342.
Pribilof, Islands, ornithological investigations in the, 573.
Prion vittatus gouldi, 550.
vittatus keyteli, 550.

Prion vittatus macgillivrayi, 550.
vittatus missus, 550.
'Proceedings of the Zoological Society of London,' review of, 559.
Procellaria æquinoctialis brabournei, 550.
æquinoctialis mixta, 550.
æquinoctialis steadi, 550.
Progne subis, 33.
subis subis, 22, 83, 474, 522.
Pseudogerygone jacksoni, 424.
Pseudoprion turtur crassirostris, 550.
turtur eatoni, 550.
turtur huttoni, 550.
turtur solanderi, 550.
Ptarmigan, Rock, 202.
Ungava, 381.
Welch's, 73, 76.
White-tailed, 202.
Willow, 202.
Pterodroma, 410.
Ptilocorys cristata ionia, 424.
cristata subtaurica, 424.
cristata weigoldi, 424.
Ptilonorhynchus minor, 556.
Ptilotis carpentariensis, 556.
cockerelli, 271.
sub-chrysops, 556.
Publications received, 125–127, 272-274, 426–428, 559–560.
Puffinus assimilis kempi, 550.
assimilis tunneyi, 550.
auricularis, 550.
borealis, 234.
carneipes, 380.
carneipes carbonarius, 550.
carneipes hakodate, 550.
carneipes hullianus, 550.
couesi, 550, 551.
griseus, 399.
griseus chilensis, 551.
griseus stricklandi, 551.
gravis, 234.
lherminieri becki, 550.
lherminieri boydi, 550.
Puffinus lherminieri nugax, 550.
opisthomelas, 550.
pacificus alleni, 550.
pacificus hamiltoni, 550.
pacificus laysani, 550.
pacificus royanus, 550.
reinholdi, 550.
reinholdi huttoni, 550.
Purdie, Henry Augustus, biographical notice of, 1–15.
Pycnonotus layardi pallidus, 557.
tricolor ngamii, 555.
Pycraft, W. P., review of his 'A History of Birds,' 405.

Quail, Gambel's, 331.
Quebec, birds of, 532, 545.
Querquedula, 409.
cyanoptera, 39.
discors, 38, 512.
Quiscalus quiscula æneus, 21, 29, 82, 110, 474, 520.
quiscala quiscala, 473, 520.

Rafinesque, C. F., Writings of 191–198, 401.
Rail, Black, 398.
King, 30, 237, 513.
Virginia, 40, 468, 513.
Yellow, 100, 237.
Rallus elegans, 30, 237, 513.
virginianus, 40, 468, 513.
Ramphomicron stanleyi, 148.
Ramsden, Charles T., *Phætusa magnirostris* Licht. in Cuba, 100; *Xanthocephalus xanthocephalus* in eastern Cuba, 103; Lark Sparrow (*Chondestes grammacus grammacus*) in Cuba, 395; Cliff Swallow (*Petrochelidon lunifrons* Say) — a Cuban record, 396; Maynard's Cuckoo (*Coccyzus minor maynardi*) in Cuba, 393; the Cuban Whip-poor-will (*Antrostromus cubanensis* Lawrence) with young, 394.

Raven, American, 28.
White-necked, 333.
Northern, 77, 372, 375, 473, 519.
Recognition marks in birds, 44, 226.
Recurvirostra americana, 42, 72.
Red-head, 39, 442, 512.
Redpoll, 77, 111, 113, 202.
Redshank, 110, 381.
Redstart, 23, 41, 83, 111, 321, 325, 478, 525.
Redwing, 110, 394.
San Diego, 333.
Regulus calendula calendula, 73, 78, 335, 526.
satrapa, 23.
satrapa satrapa, 374, 375, 526.
'Revista Italiana di Ornitologia,' review of, 268.
'Revue Francaise d'Ornithologie,' review of, 558.
'Revue Zoologique Africaine,' review of, 426.
Rhamphocorys clot-bey, 555.
Rhoads, Samuel N., birds of the paramo of central Ecuador, 141–149; additions to the known ornithological publications of C. S. Rafinesque, 191–198; ornithological notes of Rafinesque in the Western Review and Miscellaneous Magazine, Lexington, Ky., 401; notice of his expedition to Ecuador, 138.
Rhopoterpe, 257.
Richmond, Charles W., notice of his 'Descriptions of Five New Birds from the West Coast of Sumatra,' 552; his card-list of birds, 279.
Ridgway, Robert, review of his 'The Birds of North and Middle America,' Part V, 256–257.
Riley, J. H., review of his 'Three New Birds from Canada,' 117.
Ring-neck, 39.
Riparia riparia, 22, 34, 78, 83, 522.
Road-Runner, 277.
Roberts, Austin, review of his 'Economics of Ornithology in South Africa,' 121–122; see also Gunning, J. W. B.
Robin, 23, 30, 79, 84, 204, 277, 314, 326, 375, 477, 527.
Western, 111, 336.
Rook, 454.
Roosevelt, Theodore, criticism of his 'Revealing and Concealing Coloration in Birds and Mammals,' 498–507.
Rossignol, Gilbert R., Jr., an albino egg of Wilson's Plover, 392.
Rubow, C., notice of his 'Life of the Common Gull,' 119.

Sage, John H., Twenty-ninth stated meeting of the American Ornithologists' Union, 92–99; Holbœll's Grebe in Connecticut, 233.
Salpinctes obsoletus obsoletus, 335.
Saltator orenocensis rufescens, 419.
Sanderling, 47.
Sandpiper, Aleutian, 396.
Buff-breasted, 108, 112, 537.
Least, 40, 46, 47, 73, 76, 209–223, 514.
Pectoral, 40, 513.
Red-backed, 391.
Semipalmated, 46, 47, 101, 238, 252.
Solitary, 40, 108, 514.
Spotted, 19, 31, 76, 80, 222, 331, 469, 514.
Stilt, 112, 252.
Western Solitary, 277.
White-rumped, 47, 536.
Sapsucker, Red-breasted, 114.
Red-naped, 35, 332.
Williamson's, 114, 332.
Yellow-bellied, 20, 114, 323, 517.
Saxicola, 271, 396, 409.

Saxicola œnanthe leucorhoa, 250.
Sayornis phœbe, 32, 81, 316, 372, 376, 472, 518.
sayus, 333.
Schistochlamys atra aterrima, 419.
Sclater, W. L., Aves in the International Catalogue of Scientific literature, 568; review of his 'A History of the Birds of Colorado,' 258, 277, 429.
Scolopax, 230.
calidris, 110.
totanus, 381.
Scops spurrelli, 555.
Scoter, Surf, 24, 201.
White-winged, 236.
Scotiaptex nebulosa, 397.
Scott, W. E. D. and R. Bowdler Sharpe, notice of their 'Birds of Patagonia,' Vol. II, 417.
'Scottish Naturalist,' review of, 558.
Seiurus aurocapillus, 23, 43, 83, 111, 318, 377, 476, 524.
motacilla, 83, 377, 476, 524.
noveboracensis noveboracensis, 78.
Selasphorus alleni, 253.
Serinus angolensis hilgerti, 425.
Setophaga ruticilla, 23, 41, 83, 111, 321, 478, 525.
Sharpe, R. Bowdler, notice of the index to his 'Hand List of Birds,' 572, see also Scott, W. E. D.
Shearwater, Cory's 234.
Greater, 45, 234.
Pale-footed, 380.
Sooty, 399.
Sherman, Althea R., diurnal activities of the Great Horned Owl (*Bubo virginianus virginianus*), 240.
Shoveller, 39, 112, 512.
Shrike, Loggerhead, 523.
Migrant, 478.
Northern, 37.
White-rumped, 34.
Shufeldt, R. W., the photography of birds' eggs, 274–276; unusual nest site for the Cardinal, 395; the Band-tailed Pigeon (*Columba fasciata*) in North Dakota, 539.
Sialia currucoides, 336.
sialis, 30.
sialis sialis, 23, 84, 317, 376, 477, 527.
mexicana bairdi, 336.
Siptornis flammulata, 143.
Siskin, Pine, 21, 36, 324, 333, 519.
Sitta canadensis, 23, 78, 335, 374, 375, 526.
carolinensis aculeata, 111.
carolinensis, 37.
carolinensis carolinensis 84, 375, 476, 526.
carolinensis nelsoni, 335.
pusilla, 84.
pygmæa pygmæa, 335.
Smith, Austin Paul, status of the Picidæ in the lower Rio Grande Valley, 241; strange actions of a Red-eyed Cowbird, 244; recent records from the lower Rio Grande, 254.
Smyth, Ellison A., Jr., birds observed in Montgomery County, Virginia, 508–530.
Snipe, Wilson's, 40, 46, 73, 75, 210, 513.
Snowflake, 202.
Solitaire, Townsend's, 37, 335.
Somateria dresseri, 75.
mollissima borealis, 535.
Sora, 31, 277, 469, 513, 536.
South Carolina, birds of, 101, 102, 532, 541.
South Dakota, birds of, 110, 535.
Sparrow, Acadian Sharp-tailed, 21, 543.
Bachman's, 111, 376, 521.
Baird's, 72.
Cassin's, 41.

Sparrow, Chipping, 22, 33, 77, 82, 313, 425, 377, 474, 521.
Clay-colored, 41.
English, 21, 82, 286, 334, 377.
Field, 33, 82, 319, 377, 412, 474, 521.
Fox, 41, 73, 74, 77, 211, 223, 522.
Gambel's, 333, 400.
Golden-crowned, 333.
Grasshopper, 41, 82, 474, 521.
Harris's, 36, 253.
Henslow's 82.
House, 29.
Ipswich, 289, 294.
Lark, 33, 395.
LeConte's, 33, 72.
Lincoln's, 77, 521.
Mountain Song, 400.
Nelson's 72, 521.
Nevada Savannah, 384.
Sage, 335.
Savannah, 21, 72, 73, 77, 211, 316, 325, 474, 521.
Seaside, 103.
Song, 22, 36, 82, 313, 325, 372, 376, 474, 521.
Sooty Song, 253.
Swamp, 22, 77, 478, 522.
Texas, 255.
Tree, 36, 77, 204, 521.
Western Chipping, 334.
Western Tree, 111.
Western Vesper, 333.
Western Grasshopper, 253.
White-crowned, 41, 77, 121, 204, 521.
White-throated, 22, 77, 247, 315, 325, 521.
Vesper, 21, 41, 82, 316, 325, 474, 521.
Spatula clypeata, 39, 112, 521.
Speotyto cunicularia hypogæa, 28.
Sphyrapicus ruber, 114.
thyroides, 114, 332.
Sphyrapicus varius, 114.
varius nuchalis, 35, 332.
varius varius, 241, 323, 517.
Spinus, 409.
pinus, 36, 333, 520.
pinus pinus, 21, 112.
Spiza americana, 33, 544.
Spizella monticola, 36.
monticola monticola, 77, 204, 521.
monticola ochracea, 111.
pallida, 41.
passerina, 33.
passerina arizonæ, 334.
passerina passerina, 22, 77, 82, 313, 377, 474, 521.
pusilla, 33.
pusilla pusilla 82, 319, 377, 474, 521.
Spoonbill, Roseate, 42.
Sporophila haplochroma, 419.
Squatarola squatarola, 43.
Stafford, Earle F., Notes on Palmer's Thrasher (*Toxostoma, curvirostre palmeri*), 363–368.
Starling, 114, 243, 394, 558.
Steganopus tricolor, 42, 72, 400.
Stelgidoptreyx serripennis, 376, 475.
Sterna caspia, 252, 389.
forsteri, 511.
hirundo, 19, 38, 75, 511.
melanops, 197.
tschegrava, 410.
Stevens, Caroline M., capture of the Carolina Wren at Portland, Maine, 106.
Stilt, Black-necked, 72.
Stone, Witmer, Franklin's Gull (*Larus franklini*) at Philadelphia, 99; Vrœg's Catalogue, 205–208; note on Hapalopteron familiare, 250; type of the genus Saxicola, 396; the functions of the A. O. U. committee on nomenclature, 565; chosen editor of THE AUK, 136.
Streets, Thomas H., the Forked-

tailed Gull (*Xema furcatum*), 233–234.
Strix varia, 40.
varia varia, 81, 478, 517.
Strong, R. M., some reminiscences of the late Professor C. O. Whitman, 15–16; some observations on the life history of the Red-breasted Merganser, *Mergus serrator* Linn., 479–488; review of his 'Olfactory Organs and the Sense of Smell in Birds,' 115–116.
Sturnella magna, 29, 229.
magna magna, 82, 376, 473, 519.
neglecta, 29, 229, 333.
Sturnus vulgaris, 243, 394, 558.
Swales, B. H., Yellow Rail (*Coturnicops noveboracensis*) in Michigan, 100; Duck Hawk (*Falco peregrinus anatum*) in Michigan, 102; Carolina Wren (*Thryothorus ludovicianus ludovicianus*), in Michigan, 107; Yellow Rail, in Michigan; A Correction, 237.
Swallow, Bank, 22, 34, 78, 83, 522.
Barn, 22, 34, 83, 315, 325, 335, 396, 475, 522.
Cliff, 22, 34, 83, 193–195, 204, 324, 335, 396, 474, 522.
Rough-winged, 376, 475.
Tree, 22, 34, 78, 324, 478, 522.
Swarth, H. S., differences due to sex in the Black Swift, 241–242; review of his 'Report on a Collection of Birds and Mammals from Vancouver Island,' 265; review of his 'New Hairy Woodpecker from Southeastern Alaska, 118; on the alleged egg-carrying habit of the Band-tailed Pigeon, 540.
Swan, Whistling, 39, 108, 445–448.
Swift, Black, 241, 257.
Chimney, 20, 32, 81, 121, 286, 323, 325, 376, 472, 518.
Swift, White-throated, 277.
Sylvia ruficapilla, 545.
undata aremoricus, 558.
Synallaxis, 143.
Synthliboramphus antiquus, 387.

Tachornis parvus myochrous, 557.
Tachyeres cinereus, 418.
Tachyphonus nobilis, 555.
Tanager, Scarlet, 33, 83, 324, 373,
377, 474, 522.
Summer, 83.
Western, 111, 255.
Tangara guttata eusticta, 419.
guttata trinitatis, 419.
Tangavius æneus involucratus, 244.
Tarsiger stellatus transvaalensis, 557.
Taverner, P. A., two interesting records for Canada, 396.
Taylor. Walter P., review of his 'Field Notes on Amphibians, Reptiles and Birds of Northern Humboldt County, Nevada,' 264.
Tchitrea paradisi ceylonensis, 424.
Teal, Blue-winged, 38, 512.
Cinnamon, 39.
European, 535.
Green-winged, 38, 331, 511.
Telespiza cantans, 166–168, 341.
Telmatodytes palustris, 35.
palustris palustris, 526.
Tern, Black, 38, 511.
Caspian 252, 389.
Common, 19, 38, 75, 511, 538.
Forster's, 511.
Least, 538.
Royal, 538.
Sooty, 412.
White, 538.
Texas, birds of, 100, 241, 232, 244, 254, 361.
Thalassoaëtus pelagicus, 385.
Thalassodroma, 409.
Thamnophilus marcapatæ, 425.

Thayer, Abbott H., concealing coloration, 430.
Thayer, Abbott H., and Gerald H., discussion of their work on concealing coloration, 489–507.
Thayer, John E., Great Auk eggs in the Thayer Museum, 208–209; Killdeer (*Oxyechus vociferus*) at Lancaster, Mass., 537.
Thorn-bill, 148.
Thrasher, Brown, 35, 84, 377, 476, 525.
Palmer's, 363–368.
Sage, 224–226.
Thriponax javensis buttekoferi, 552.
Thrush, Audubon's Hermit, 336.
Dwarf Hermit, 336.
Hermit, 23, 79, 250, 316, 325, 527.
Olive-backed, 23, 41, 318, 325, 526.
Wilson's, 374, 375.
Wood, 35, 84, 318, 325, 377, 412, 477, 526.
Thryomanes bewickii bewickii, 84, 478, 525.
bewicki catalinæ, 386.
bewickii cryptus, 35.
bewicki marinensis, 386.
Thryothorus ludovicianus, 30.
ludovicianus ludovicianus, 84, 106, 107, 377, 525.
Thurston, Henry, another record of the Philadelphia Vireo from Long Island, N. Y., 105.
Ticehurst, N. F., see Hartert, E.
Tigribaphe leucolæma, 424.
Tinamou, 143.
Titmouse, Bridled, 335.
Tufted, 41, 84, 376, 477, 526.
Todd, W. E. Clyde, review of his 'Descriptions of New Neotropical Birds,' 419.
Todd, W. E. Clyde, and W. W. Worthington, review of their 'Contribution to the Ornithology of the Bahama Islands,' 123.
Totanus flavipes, 40, 76, 514.
totanus, 110, 381.
melanoleucus, 40, 73, 76, 514.
Towhee, 33, 82, 376, 474, 521.
Cañon, 335.
Green-tailed, 255–335.
Spurred, 335.
Townsend, Charles W., the validity of the red-legged subspecies of Black Duck, 176–179; notes on the summer birds of the St. John Valley, New Brunswick, 16–23; bird genealogy, 285–295; the case of a Crow and a Ruffed Grouse, 542; review of his 'Captain Cartwright and his Labrador Journal,' 263.
Toxostoma curvirostre palmeri, 363, 368.
rufum, 35, 84, 377, 476, 525.
Trichodere, 271.
Tringa, 409.
leucophæa, 208.
Trochilus, 257.
Troglodytes aëdon aëdon, 84, 476, 525.
solitarius, 419.
Trogon, 257.
Trogonurus, 257.
Tropic-bird, Yellow-billed, 49–71.
Trotter, Spencer, the relation of genera to faunal areas 159–165; the names Purple Finch, Mavis and Highole, 255.
Tryngites subruficollis, 112, 537.
Turdus camtschatkensis, 385.
iliacus, 109, 387.
pilaris sarudnyi, 424.
viscivorus loudoni, 557.
viscivorus sarudnyi, 424, 557.
Turkey, Wild, 28, 80, 469, 514.
Tympanuchus americanus, 28.
Tyrannus tyrannus, 21, 32, 76, 81, 317, 376, 472, 518.
Tyto, 409.

Upucerthia excelsior, 146.

Uræginthus cyanocephalus mülleri, 425.
Uranomitra, 257.
Uria lomvia lomvia, 251.
Urinator arcticus suschkini, 426.

Veery, 23, 79, 84, 317, 325, 374, 477, 526.
Venezuela, birds of, 419.
'Verhandlungen der Ornithologischen Gesellschaft in Bayern,' review of, 425.
Vermivora, 229.
bachmani, 105.
celata celata, 523.
chrysoptera, 523.
lawrencei, 247.
peregrina, 41, 523.
rubricapilla rubricapilla, 22, 322.
ruficapilla, 545.
Vermont, birds of, 104.
Vinago calva uellensis, 425.
Vireo, Bell's, 41.
Blue-headed, 22, 321, 523.
Mountain, 373, 376.
Philadelphia, 105.
Red-eyed, 22, 34, 83, 320, 376, 475, 523.
Warbling, 34, 83, 475, 523.
White-eyed, 34, 83, 377.
Yellow-throated, 83, 475, 523.
Vireo, 229.
belli, 41.
griseus, 34.
griseus griseus, 83, 377.
Vireolanius leucotis simplex, 424.
Vireosylva gilva, 34.
gilva gilva, 83, 475, 523.
olivacea, 22, 34, 83, 320, 376, 475, 523.
philadelphica, 105.
Virginia, birds of, 79–84, 347, 399, 508–530.
Visher, Stephen Sargent, additions to a list of the birds of Harding county, northwestern South Dakota, 110; Northern Eider in South Dakota, a new record for the interior of North America, 535.
Vulture, Black, 80, 515.
Turkey, 31, 80, 332, 376, 470, 515.

Warbler, Audubon's, 335.
Bachman's, 105.
Bay-breasted, 23, 78, 545.
Black and White, 22, 78, 83, 322, 377, 475, 523.
Black-poll, 78, 211, 524.
Black-throated Blue, 23, 278, 321, 475, 524.
Black-throated Green, 23, 78, 323, 373, 375, 476, 524.
Blackburnian, 322, 373, 376, 476, 524, 545.
Cairns', 373, 376.
Canada, 23, 78, 324, 373, 376, 476, 525.
Cape May, 523, 545.
Cerulean, 524.
Chestnut-sided, 78, 324, 373, 376, 476, 524.
Connecticut, 396.
Golden-winged, 475, 523.
Hooded, 83, 249, 377, 476, 525.
Kentucky, 377.
Kirtland's, 72.
Lawrence's, 247.
Magnolia, 23, 78, 322, 325, 475, 524.
Mourning, 324.
Myrtle, 23, 37, 73, 78, 291, 324, 524.
Nashville, 22, 322, 545.
Northern Parula, 23, 324, 478, 523.
Orange-crowned, 523.
Palm, 247.
Parula, 377.
Pileolated, 254.

Warbler, Pine, 83, 476, 524.
Prairie, 83, 377, 524.
Tennessee, 41, 523.
Townsend's, 400.
Wilson's, 78, 412, 525.
Worm-eating, 523.
Yellow, 23, 34, 78, 83, 105, 376, 412, 475, 524.
Yellow Palm, 78, 524.
Washington, birds of, 224–226.
Water-Thrush, 78.
Louisiana, 83, 105, 377, 476, 524.
Waxwing, Bohemian, 43, 44, 104, 111, 204.
Cedar, 22, 37, 83, 323, 373, 375, 400, 475, 523.
Wayne, Arthur T., Bachman's Warbler in Camden Co. and breeding in Chatham Co., Geor-Georgia, 105; the Golden Plover (*Charadrius dominicus dominicus*) on the coast of South Carolina, 101; the Seaside Sparrow (*Passerherbulus maritimus maritimus*) breeding on the coast of Georgia near Savannah, 103.
Weber, J. A., the Black-backed Gull (*Larus marinus*) on Long Island, N. Y., in August, 100; an unusually late nesting date of the Catbird (*Dumetella carolinensis*, 106; a case of cannibalism among Blackbirds, 394.
West Indies, birds of, 116.
West Virginia, birds of, 111.
Wetmore, Alexander, notice of his expedition to Porto Rica, 138; new records from Arkansas, 112.
Wheatear, Greenland, 250.
Wheeler, David E., notes on the spring migration at timberline, north of Great Slave Lake, 198–204.
Whimbrel, 558.
Whip-poor-will, 32, 81, 151–156, 259, 324, 376, 472, 518.
Whip-poor-will, Cuban, 394.
Whistler, 19.
Whitman, C. O., reminiscences of, 15–16.
Widgeon, European, 235, 536.
Willet, Western, 40, 72, 537.
Willett, George, review of his 'Birds of the Pacific coast of southern California,' 548.
'Wilson Bulletin,' review of, 421.
Wilsonia canadensis, 23, 78, 373, 376, 476, 525.
citrina, 83, 249, 377, 476, 525.
pusilla pileolata, 254.
pusilla pusilla, 78, 525.
Wisconsin, birds of, 172, 238, 388, 397.
Witherby, H. F., see Hartert, E.
Wollaston, A. J. R., proposed Expedition to New Guinea, 573.
Wood, N. A., review of his 'Birds of the Charity Islands, Michigan,' 118.
Woodcock, 19, 42, 46, 72, 80, 469, 513.
Woodpecker, Alpine Three-toed, 400.
Arctic Three-toed, 76.
Ant-eating, 332.
Cactus, 383.
Downy, 76, 81, 324, 376, 471, 517.
Hairy, 20, 28, 81, 375, 471, 517.
Lewis's, 332, 400.
Newfoundland, 76.
Northern Pileated, 323, 471, 517.
Pileated, 81.
Red-bellied 31, 81, 517.
Red-headed, 20, 31, 472, 517, 541.
San Fernando, 383.
Southern Downy, 28.
White-breasted, 332, 383.
White-headed, 252.
Woodruff, Frank M., two interest-

ing captures in Lincoln Park, Chicago, 109.
Worcester, Dean C., review of his 'Newly Discovered Breeding Places of Philippine Birds,' and 'Hybridism among Boobies,' 267.
Worthington, W. W., *see* Todd, W. E. Clyde.
Wren, Andean Marsh, 143.
Bewick's, 84, 478, 525.
Cañon, 277, 335, 400.
Carolina, 30, 106, 107, 377, 525.
House, 84, 412, 476, 525.
Long-billed Marsh, 35, 526.
Rock, 335.
Short billed Marsh, 478, 526.
Texas Bewick's, 35.
Winter, 23, 37, 78, 324, 373, 375, 412, 526.
Wright, Horace W., a Crested Flycatcher in December at Cambridge, Mass., 242–243; a Palm Warbler in winter at Boston, Mass., 247; morning awakening and even-song, 307–327; a Starling at Squantum, Mass., 394; review of his 'Birds of the Jefferson Region,' 411.
Wright, Albert Hazen, early records of the Carolina Paroquet, 343–363.
Wyman, L. E., White-throated Sparrow in Idaho, 247; Oreortyx in Idaho, 538.

XANTHOCEPHALUS xanthocephalus, 41, 103, 333.
Xema furcatum, 233–234.
sabini, 388.
Xenopicus albolarvatus, 252.

YELLOW-LEGS, 40, 76, 514.
Greater, 40, 73, 76, 514.
Yellow-throat, Maryland, 23, 78, 83, 321, 376, 476, 525.
Western, 34.

ZAMELODIA ludoviciana, 33, 373, 375, 478, 522.
Zenaidura macroura carolinensis, 19, 28, 80, 332, 376, 381, 469, 515.
macroura marginella, 381.
Zonotrichia albicollis, 22, 77, 247, 315, 521.
coronata, 333.
leucophyrs, 41.
leucophrys gambeli, 333, 400.
leucophrys leucophrys, 77, 204, 521.
querula, 36, 253.
'Zoologist,' review of, 271, 558.

ERRATA.

Page 30, line 22, for **Sialia sialia** read **Sialia sialis**.
" 40, " 26, " **Catophophorus** read **Catoptrophorus**.
" 76, " 15, " **macularius** read **macularia**.
" 80, " 14, " " " "
" 83, " 42, " **polyglottus** read **polyglottos**.
" 112, " 34, " **Tringites** read **Tryngites**.
" 135, " 10, " *Onocratalus* read *Onocrotalus*.
" 182, " 9, " *phrrhula* read *pyrrhula*.
" 238, " 33, " *phasianellis* read *phasianellus*.
" 387, " 3, " Henninger etc. read Grönberger, Auk, 1912, p. 109.
" 411, " 7, " *falimellus* read *falcinellus*.
" 424, " 20, " *griseiaceps* read *griseiceps*.
" 23, " *ioniul* read *ioniae*.
" 25, " *Barbater* read *Barbatula*.
" 26, " *supæ* read *super*.
" 31, " London read Loudon.

DATES OF ISSUE OF VOL. XXIX.

No. 1 — January 10. No. 2— April 5.

No. 3 — July 6.

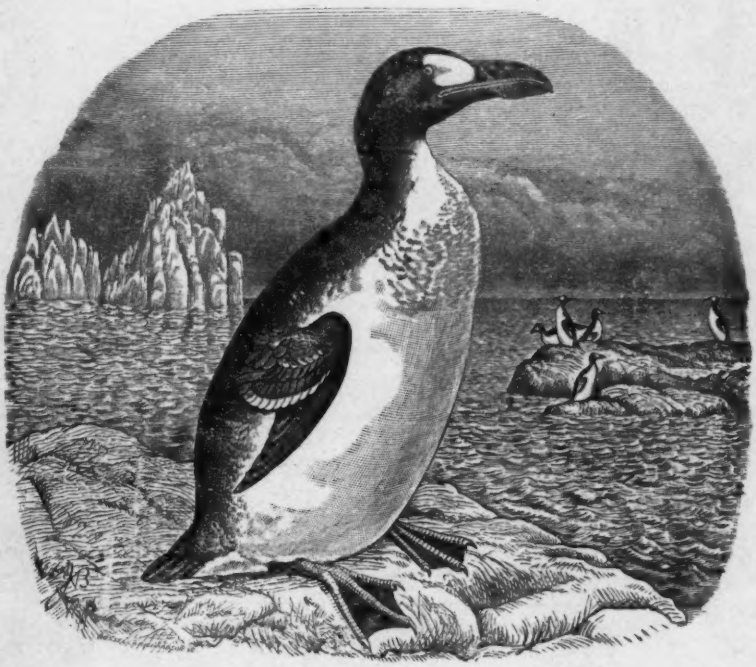
Old Series, Vol. XXXVII | CONTINUATION OF THE BULLETIN OF THE NUTTALL ORNITHOLOGICAL CLUB | New Series, Vol. XXIX

The Auk

GENERAL LIBRARY
OCT 1-4 1912
UNIV. OF MICH.

A Quarterly Journal of Ornithology

Vol. XXIX OCTOBER, 1912 No. 4



PUBLISHED BY

The American Ornithologists' Union

CAMBRIDGE, MASS.

Entered as second-class mail matter in the Post Office at Boston, Mass.

CONTENTS

PAGE

THE FREEZING OF CAYUGA LAKE IN ITS RELATION TO BIRD LIFE. By *Alvin R. Cahn.* (Plates XVI–XX) 437

THE NIAGARA SWAN TRAP. By *J. H. Fleming* 445

METHODS OF ESTIMATING THE CONTENTS OF BIRD STOMACHS. By *W. L. McAtee* 449

THE BREEDING BIRDS OF SOUTHERN CENTER COUNTY, PENNSYLVANIA. By *Richard C. Harlow* 465

SOME OBSERVATIONS ON THE LIFE-HISTORY OF THE RED-BREASTED MERGANSER, *Mergus serrator*, LINN. By *R. M. Strong.* (Plates XXI–XXIII) . . 479

REMARKS ON THE CASE OF ROOSEVELT *vs.* THAYER, WITH A FEW INDEPENDENT SUGGESTIONS ON THE CONCEALING COLORATION QUESTION. By *Francis H. Allen.* 489

BIRDS OBSERVED IN MONTGOMERY COUNTY, VIRGINIA. By *Ellison A. Smyth, Jr.* (Plate XXIV) 508

GENERAL NOTES.— Laughing Gulls in Plymouth County, Mass., 531; Brown Pelican on Pamlico Sound and at Durham, N. C., 531; The Man-o'-War-bird (*Fregata aquila*) on the Coast of Georgia, 531; Mallard and Black Ducks at Currituck, N. C., 533; Dispersal of the Australian Duck (*Anas superciliosa*), 534; The European Teal (*Nettion crecca*) again Returning to Wenham, Mass., 535; Northern Eider in South Dakota; a new record for the interior of North America, 535; Records from Nippinickett Pond, Bridgewater, Mass., 536; Carolina Rail (*Porzana carolina*) in New Mexico, 536; Early Occurrence of the White-rumped Sandpiper (*Pisobia fuscicollis*) in Maine, 536; Uncommon Shore-birds seen in Essex County, Mass., 537; Killdeer (*Oxyechus vociferus*) at Lancaster, Mass., 537; Ocracoke Water Bird Notes, 538; Oreortyx in Idaho, 538; Passenger Pigeon (*Ectopistes migratorius*) in Alberta, 539; The Band-tailed Pigeon (*Columba fasciata*) in North Dakota, 539; On the Alleged Egg-carrying Habit of the Band-tailed Pigeon, 540; Pigeon Hawk in South Carolina in Winter, 541; Red-headed Woodpecker at Newburyport, Mass., 541; The Case of a Crow and a Ruffed Grouse, 542; Concerning the Hawaiian Linnet, 543; The Acadian Sharp-tailed Sparrow and Other Birds at Plymouth, Mass., 543; Notes on the Dickcissel in Colorado, 544; Proper Name for the Nashville Warbler, 545; Abundance of the Cape May Warbler (*Dendroica tigrina*) around Quebec, 545; Mimicry in the Song of the Catbird, 545; Another Occurrence of the Blue-gray Gnatcatcher in Essex County, Massachusetts, 546; A Third Blue-gray Gnatcatcher in Maine, 546.

RECENT LITERATURE.— Barrow's 'Michigan Bird Life,' 547; Willett's 'Birds of the Pacific Slope of Southern California,' 548; Mathews' 'Bird of Australia,' 549; The Austral Avian Record No. 3, 551; Bryant on The Present and Future Status of the California Valley Quail, 551; Grinnell's 'Systematic List of the Birds of California,' 551; Chapman on New Colombian Birds, 552; Chapman on a New Ibis from Mt. Kenia, 552; Richmond on New Birds from the West Coast of Sumatra, 552; Beebe on New Blood Pheasants, 552; Oliver on the Geographic Relationships of the Birds of Lord Howe, Norfolk, and the Kermadec Islands, 553; Gladstone's 'The Vertebrate Fauna of Dumfriesshire, 553; Horsbrugh and Davies on the Game-Birds and Water-Fowl of South Africa, 553; The Ornithological Journals, 554; Ornithological Articles in other Journals, 558; Publications Received, 559.

CORRESPONDENCE.— The Functions of the A. O. U. Committee on Nomenclature, 561; Aves in the International Catalogue of Scientific Literature, 568.

NOTES AND NEWS.— Obituary; Wilhelm Blasius, 571; John Gerrard Keulemans, 571; Bird Banding Abroad, 571; The American Museum's Colombian Expedition, 572; Ornithological Investigations in the Pribilof Islands, 572; Index to Sharpe's Hand List of Birds, 572; Wollaston's Expedition to New Guinea, 572; Annual General Meeting of the B. O. U., 573; Book Notice, 573; A Great Auk for Sale, 573; The Delaware Valley Ornithological Club Collection, 573; Thirtieth Stated Meeting of the A. O. U., 574.

INDEX 575

ERRATA 605

DATES OF ISSUE 605

CONTENTS i

'THE AUK,' published quarterly as the Organ of the AMERICAN ORNITHOLOGISTS' UNION, is edited, beginning with the Volume for 1912, by Mr. WITMER STONE, of Philadelphia.

TERMS:— $3.00 a year, including postage, strictly in advance. Single numbers, 75 cents. Free to Honorary Fellows, and to Fellows, Members, and Associates of the A. O. U. not in arrears for dues.

Subscriptions should be addressed to DR. JONATHAN DWIGHT, Jr., Business Manager, 134 WEST 71ST ST., NEW YORK, N. Y. **Foreign Subscribers** may obtain 'THE AUK' through R. H. PORTER, 9 PRINCES STREET, CAVENDISH SQUARE, W., LONDON.

All **articles** and **communications** intended for publication, and all **books** and **publications** for notice, should be sent to MR. WITMER STONE, ACADEMY OF NATURAL SCIENCES, LOGAN SQUARE, PHILADELPHIA, PA.

Manuscripts for general articles should reach the editor at least six weeks before the date of the number for which they are intended, and manuscripts for 'General Notes' and 'Recent Literature' not later than the first of the month precedir g the date of the number in which it is desired they shall appear.

PUBLICATIONS OF THE

AMERICAN ORNITHOLOGISTS' UNION

FOR SALE AT THE FOLLOWING PRICES:

The Auk. Complete set, Volumes I–XXVIII, (1884–1911) in original covers, $96.00. Volumes I–VI are sold only with complete sets, other volumes, $3.00 each; 75 cents for single numbers.

Index to The Auk. (Vols. I–XVII, 1884–1900) and Bulletin of the Nuttall Ornithological Club (Vols. I–VIII, 1876–1883), 8vo, pp. vii + 426, 1908 Cloth, $3.75; paper, $3.25.

Check-List of North American Birds. Third edition, revised, 1910. Cloth, 8vo., pp. 426, and 2 maps. $2.50, net, postage 25 cents. Second edition, revised, 1895. Cloth, 8vo, pp. xi + 372. $1.15. Original edition 1886. Out of print.

Abridged Check-List of North American Birds. 1889. (*Abridged and revised from the original edition*). Paper, 8vo, pp. 71, printed on one side of the page. 25 cents.

Pocket Check-List of North American Birds. (*Abridged from the third edition*). Flexible cover, $3\frac{1}{4} \times 5\frac{3}{4}$ inches. 25 cents; 10 copies for $2.00.

Code of Nomenclature. Revised edition, 1908. Paper, 8vo, pp. lxxxv. 50 cents.
Original edition, 1892. Paper, 8vo, pp. iv + 72. 25 cents.

Address JONATHAN DWIGHT, Jr.

134 W. 71st St., New York City

American Ornithologists' Union

Check-List of North American Birds

Last Edition, 1910

Cloth, 8vo, pp. 430 and two maps of North America, one a colored, faunal zone map, and one a locality map.

The first authoritative and complete list of North American Birds published since the second edition of the Check-List in 1895. The ranges of species and geographical races have been carefully revised and greatly extended, and the names conform to the latest rulings of the A. O. U. Committee on Nomenclature. The numbering of the species is the same as in the second edition. Price, including postage, $2.75.

POCKET EDITION

A pocket Check-List (3¼ by 5¾ inches) of North American Birds with only the numbers and the scientific and popular names. Alternate pages blank for the insertion of notes. Flexible covers. Price, including postage, 25 cents; or 10 copies for $2.00.

Address JONATHAN DWIGHT, Jr.

134 W. 71st St. New York City